O-QAS

HIB - GA 14/15
Nov./Dec. 1956
Vol. 2:14/15 ***

# T R O P I C A L  H O U S I N G  &  P L A N N I N G

# M O N T H L Y  B U L L E T I N

for Dr. C. A. Doxiadis*

## CLASSIFICATION SYSTEM USED BY DOXIADIS ASSOCIATES

A The Problems

B The Policies

C The Programs

D People, Development, and Ekistics **
Geographic factors
Industry
Agriculture
Transportation

E Houses

F Structures (exclusives of Houses)

G Community service

H Regions

I Major urban centers

J Market towns
(medium-sized and small towns)

K Villages
Rural land

L Farms

M Surveys
Census data
Topographical surveys

N Research

O Planning

P Financing

Q Urban land

R Labor

S Materials

T Construction
(systems of building and costs)

U Implementation

V Management

W Administration

X Legislation

** Refers to centers of activities in relation to their surrounding regions.

Appendix

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

***September and October were numbered 1 and 2 respectively. Beginning in November the Bulletins will be numbered consecutively.

*This report has been compiled for private circulation only by Prof. J. Tyrwhitt, 77 Trowbridge St. Cambridge, Mass., USA.

TABLE OF CONTENTS (1)


A United Nations. Economic Commission for Asia and the Far East, and United Nations Educational, Scientific and Cultural Organization. Joint UN/UNESCO Seminar on Urbanization in the ECAFE Region, 1956 — 34

B United Nations. Technical Assistance Programme. Draft report of Seminar on Housing through Non-Profit Organizations in Asia and the Far East, Copenhagen, Denmark, 31 July - 27 August, 1956 — 52

C United Nations. Economic Commission for Asia and the Far East, and United Nations Educational, Scientific and Cultural Organization. Joint UN/UNESCO Seminar on Urbanization in the ECAFE Region, 1956 — 34

United Nations Technical Assistance Programme. Draft report of Seminar on Housing through Non-Profit Organizations in Asia and the Far East, Copenhagen, Denmark, 31 July - 27 August 1956. — 52

D American Friends Service Committee. The Tur'an agricultural project — 56

Davenport, John. Why Peru pulls dollars. — 57

Kingsley Davis and Hilda Hertz. The World Distribution of Urbanization (International Statistical Institute, Bulletin, 1951, vol. XXXIII, Part IV, pp. 227-242, with tables.) — 59

Mitchell, J. M., Jr. Link warmer climate to city growth. — 60

Skeet, T. H. H. India on the move. — 61

United Nations. Economic Commission for Asia and the Far East, and United Nations Educational, Scientific and Cultural Organization. Joint UN/UNESCO Seminar on Urbanization in the ECAFE Region, 1956 — 34

E United Nations. Technical Assistance Programme. Draft report of Seminar on Housing through Non-Profit Organizations in Asia and the Far East, Copenhagen, Denmark, 31 July - 27 August 1956. — 52

L'Aero-Habitat, Algiers — 62

Rechter, Jacob. Israel builds. — 63

F Ancora Chandigarh, in L'Architettura. — 64

U.S. Foreign Operations Administration. Plant requirements for manufacture of concrete blocks and slabs for walls — 66

G Isard, Walter, and R. E. Coughlin. Municipal costs and revenues resulting from community growth — 67

Urrutia, R. B. San Juan's newest water supply (Puerto Rico) — 72

H Davenport, John. Why Peru pulls dollars. — 57

United Nations. ECAFE seminar. Rapporter's summary report -- item 4 (3). Policies for town and country planning, by Ernest Weissmann. — 46

United Nations. ECAFE seminar. Urbanization in Japan, by Eiichi Isomura 39

K Atlantic monthly. Perspective of the Arab world. 73

Giordani, Pierluigi. Paesi di bonifica (Po Valley, Italy). 75

M United Nations. ECAFE seminar. Demographic aspects of urbanization in the ECAFE region, by the Population Branch, UN Secretariat. 35

United Nations. ECAFE seminar. World and Asian urbanization in relation to economic development and social change, by Philip M. Hauser. 37

N United Nations. ECAFE seminar. Rapporter's summary report -- item 4 (3). Policies for town and country planning, by Ernest Weissmann. 46

P United Nations. ECAFE seminar. Preliminary report on agenda item 2 (Economic causes and implications of urbanization), statement by G. V. Subba Rao (ECAFE Secretariat). 43

United Nations. Technical Assistance Programme. Draft report of Seminar on Housing through Non-Profit Organizations in Asia and the Far East, Copenhagen, Denmark, 31 July - 27 August 1956. 52

U.S. Bureau of Foreign Commerce. Investment in Japan: basic information for United States businessmen. 76

R United Nations. ECAFE seminar. Urbanization in Japan, by Eiichi Isomura 39

T Graus, H. U.S. Army develops heating and air conditioning units. 78

McClure, F. A. Bamboo as a building material. 79

Merrington, G. J. Some aspects of climate as it affects building and planning. 91

Solar heating: nine-room house going up in Denver to test system. 92

Appendix

Current projects in North America 93

United Nations. Economic Commission for Asia and the Far East, and United Nations Educational, Scientific and Cultural Organization. Joint UN/UNESCO Seminar on Urbanization in the ECAFE Region. Jointly sponsored by UNESCO, the UN Bureau of Social Affairs, and the Secretariat of the UN Commission for Asia and the Far East, in co-operation with the International Labour Office. 8-18 August 1956, Bangkok, Thailand. Various paging.

Papers at the seminar are for participants only, but may be consulted at UN headquarters in New York City. Excerpts and/or digests have been made of the following:

Demographic aspects of urbanization in the ECAFE region, by the the Population Branch, UN Secretariat p. 35

World and Asian urbanization in relation to economic development and social change, by Philip M. Hauser. p. 37

Urbanization in Japan, by Eiichi Isomura p. 39

Human and social aspects or urbanization: effects of urbanization on family life in ECAFE, by UN Bureau of Social Affairs p. 40

Human and social aspects of urbanization in Asia: the social implications of industrialisation and urbanization. p. 42

Preliminary report on agenda item 2 (Economic causes and implications of urbanization), statement by G. V. Subba Rao (ECAFE Secretariat). p. 43

Report on item 3 (e) of the Agenda. Problems of labour stability, the lack of vocational training and productivity, by P. S. Narasimhan p. 44

Rapporteur's summary report -- item 4 (3). Policies for town and country planning, by Ernest Weissmann p. 46

Conclusions p. 50

The purpose of the Seminar was: To create an awareness in administrative and research circles of the problem and of possibilities of coping with it.

1. General problem in ECAFE region.
2. Economic causes and implications of urbanization in ECAFE.
3. Human and social aspects of urbanization in ECAFE.
4. (1) Location of industries.
   (2) Alternatives to over-rapid urbanization (social).
   (3) Policies for town and country planning (physical planning).
   (4) Social, educational and labor policies (employment).

United Nations, ECAFE Seminar
Demographic Aspects of Urbanization in the ECAFE Region by The Population Branch, UN Secretariat (mimeo. 42 p)

p. 2. With a few exceptions, notably Japan and Korea, most of the ECAFE countries recognize as urban, places of 5000 2500 or 1000 inhabitants, depending on the country...For this paper, we shall use...20,000 and more as the urban index...It is seldom possible to distinguish in the censuses between the city proper and its suburbs... Despite their shortcomings... 'urban' is likely to contain a heavy concentration of clearly urban population, while 'rural' will be heavily weighted toward village or clearly rural areas.
p. 3. The population of the countries represented at this seminar was... 96% of total for the continent of Asia.

| p. 4. | % total world pop. in cities of 20,000 or more | % world pop. in cities of 100,000 or more | % "city pop." in places of 100,000 or more |
|---|---|---|---|
| World | 21 | 13 | 62 |
| Oceania | 47 | 41 | 87 |
| North America north of Rio Grande | 42 | 29 | 69 |
| Europe (not USSR) | 35 | 21 | 60 |
| South America | 26 | 18 | 69 |
| Central America and Caribbean | 21 | 12 | 57 |
| USSR | 31 | 18 | 58 |
| Asia | 13 | 8 | 63 (ECAFE 96% Asia) |
| Africa | 9 | 5 | 51 |

p. 5. Range in last column not great, except Oceania and Africa, being 57-69% (precis) i.e. approx two thirds urban pop normally in large cities.

| p.6 | % total pop. | % pop. in cities 20,000 or more | % pop. in cities 100,000 or more |
|---|---|---|---|
| World | 100 | 100 | 100 |
| Asia | 53.2 | 33.8 | 33.7 |
| Europe | 16.4 | 27.5 | 26.5 |
| North America | 6.8 | 13.9 | 15.2 |
| USSR | 8.1 | 12.0 | 11.2 |
| South America | 4.6 | 5.8 | 6.5 |
| Africa | 8.2 | 3.7 | 3.2 |
| Central America | 2.1 | 2.1 | 2.0 |
| Oceania | 0.5 | 1.2 | 1.6 |

The 13% of the Asia population that is considered urban accounts for one third of the total urban population of the world.
Attention is drawn to the three regions which contain a proportion of the world's urban population either equal or inferior to their share of the world's total population, i.e. Central America, Asia and Africa. The total population of these regions comprises approx. two-thirds of the total population of the world. As far as Asia is concerned, it contains more than half the world's population but merely a third of the world's urban population.

U. N. Secretariat - 2

p.9. K.Davis has classed as "highly urbanized" those countries having at least 25% of their population living in agglommerations of 20,000 and more inhabitants and at least 15% in agglommerations of 100,000 and more inhabitants. By adopting the same criteria in all ECAFE countries only Japan, Hong Kong and the Federation of Malaya (including Singapore) may be considered highly urbanized...only 7% ECAFE's pop. while sharing between them one quarter of urban pop. of area... China and India represent 70% pop. of this region and yet they have only 10% and 12% respectively of their populations in localities of 20,000 and more... and 7% in the large cities.

p.10.In Japan, India, Burma, Pakistan the pop. in localities of 20-50,000 is greater than the total for localities 50,000-100,000. In other words the small cities surpass the middle-sized cities while this pattern is more often to the contrary in the highly urbanized countries.
p.12 A systematic study of urbanization throughout the world reveals that this phenomemon follows on the whole a pattern which is almost identical with that found for the United States over the one hundred and fifty years (1800-1950)... It (the curve) is divided roughly into 5 phases: 1) the rate of growth of the urbanization index is continually increasing; 2) the rate of growth is maintained at a high level (exponential function); 3) the rate of growth decreases progressively (linear function); 4) the rate of growth is nil (a constant function); 5) the rate of growth is slightly decreasing (a decreasing function). The last phase is still rather problematic and has been observed over a sufficiently long period only in England and Wales.
p.13 The under-developed countries are in general either in the first stage...or in a slightly more advanced stage... The urbanization index was multiplied exactly 2.7 times between 1910 and 1950 in India and between 1810 and 1850 in the US... An extremely rapid process of urbanization which took place in Japan...since the end of the 19th century was interrupted only by the last war after the country had attained a level of urbanization comparable with that of the US.
p.14 It is found in Japan and India the larger the locality, the greater the population increase.
p.18 The tendency for the population to become more masculine as localities become more urban reflects, primarily, the sex composition of migrants from rural areas... Rural-urban migration in the Asian countries is primarily a movement of males. In many of the countries of S.E. Asia tradition does not sanction the employment of women outside the home. Thus, while the volume of rural-urban migration is largely dependent on the economic situation, the demographic characteristics of the migrants are conditioned by long established societal patterns...In Pakistan...there are 123 males per 100 females in towns of 10,000-20,000; 149 per 100 in cities of 50,000-100,000; 136 per 100 in cities of 100,000 and more.

p.20 In almost all countries throughout the world the urban population has a higher proportion of young adults and lower proportion of children than the rural population. The findings for the 7 ECAFE countries for which data are available do not reveal any deviations from this general pattern.
p.21 It would seem that the city carries a disproportionally small share of the country's youth and aged. The urban working males appear to be far less heavily taxed in this respect than those living outside the cities...But the men who leave their villages to seek employment in the cities very often send regular remittances to their families and relatives or save their earnings and return with them to their rural place of origin...Furthermore it may well be that the cost of support per dependent is higher in the urban than in the rural areas.

United Nations, ECAFE seminar

World and Asian Urbanization in relation to Economic Development and Social Change
by Philip M. Hauser, Professor of Sociology, University of Chicago

p.4 Whereas domestication of plants and the appearance of an agricultural economy appears to have been the prerequisite to the emergence of the village the rise of the town or city apparently required a number of additional technological and cultural developments, including: 1) greatly increased agricultural production; 2) adequate water supply; 3) effective communication and transportation; 4) forms of political and social organization including forms of super-ordination and subordination and trade.

p.5 The multi-function city is seen as a recent phenomenon associated with modern industrialization, transport and administration...The city of the industrial revolution could and did reach a relatively large size - over a million...It became the habitat which modified the way of life of the major portion of the population of the industrialized countries; and profoundly altered also the way of life of the rural population which remained resident outside of urban places.
p.11 The inverse relationship between the degree of agriculturism and urbanization has been documented by Davis and Golden. Countries of the world grouped by per cent of males gainfully employed in agriculture show a consistent pattern of decreasing urbanization with increasing dependence on agriculture...There is an inverse relationship between urbanization and agricultural density as measured by males in agriculture per square miles of agricultural land. Thus countries with high agricultural density, thus defined, have the smallest proportion of urban population...
p.12 The inverse relationship between agricultural density and urbanization reflects of course the efficiency of agriculture as a factor in urbanization. Low agricultural density, on this broad continental basis, is an index of advanced technology and relatively high agricultural productivity...In 1800 "the population in large cities was distributed over the earth in much the same fashion as the general population"(Davis and Golden) Since then (precis) industrialized countries have gone through cycles of rapid growth or urbanization and then slackened off. It is possible "the next fifty or one hundred years may find the city population once again distributed roughly in proportion to the world's total population. If so it will mark the end of a gigantic cycle - the urbanization of the world."(Davis and Golden) "Urbanization and the Development of pre-industrial areas", Economic Development and Cultural Change, vol.III,no.1)
p.19 The pre-industrial European world on the eve of the development of industry is described as "essentially a loose-knit system of food economies centering on a few relatively large merchantile-administrative capitals, with a growing inter-regional commerce but no marked territorial division of labour." (Eric E.Lampard) This description is also an apt characterization of the situation in a number of the countries of Asia...
p.21 The major ingredients of the rapid development of industrial urban centers in Europe and the US included the emergence of new fuels, materials and mechanical aids, a closer integration of productive and managerial processes and improvements in transport and communication. The technological base for the third phase of urbanism, the metropolitan phase, is in general found in the great increase in the application of science to industry, in the widespread utilization of electric power and in the advent of the automobile. The third phase does not represent a sharp break with the second but rather a "widening and deepening of technical influences in every aspect of our existence." (Lampard)...
p.22 The metropolitan community at once represents decentralization and specialization and differentiation of function with integration and interdependence relationships.
p.27 "Community" is a grouping of individuals that arises in a given area through the interdependence created by the mechanisms of competition. "Society" is an organization of persons which is achieved through communication, through the emergence of consensus and a common culture. The process of competition is impersonal, unconscious and involves no social contact...The pre-industrial rural aggregation was in larger measure a "society" than a "community". The city is in large measure a "community" rather than a "society".

U. N. Hauser - 2

p. 28 With heterogeneity of peoples, the individual grows more instable and insecure on the one hand; and rational and sophisticated and cosmopolitan on the other . . . It is in the heterogeneity of cultures that many social scientists have traced the source of social change, of innovation that is associated with urban civilization.

p. 29 The urban setting in effect has modified the nature of human nature . . . In the pre-urban setting there is generally a prescribed way of dealing with most situations, certainly the most important recurrent situations in life. In the city there are almost always alternatives -- and the person is forced to make a choice. This enforced rationalism frequently produces bad choices, strains and adverse reactions. But it has also opened up new vistas . . . It is not merely a coincidence that the great centers of learning, invention, innovation, art and culture have historically been in urban areas . . . The "city mentality" described by Park, characterized by its sophistication, objectivity, utilitarianism and rationalism is on the one hand a product of the urban environment and on the other a major force producing and influencing changes in our social heritage, in our economic, social and political institutions and in the urban environment itself.

p. 32 The acute character and specific form in which types of personal and social disorganization plague us today (paupers, sweated labor, unemployed, aged dependents, strikers, revolutionists, juvenile delinquents, criminals, etc.) derive largely from the present stage of industrialization and urbanization processes by no means yet complete. A disproportionate share of the personal and social disorganization of the city is generally to be found among the newcomers to the urban environment and particularly among the second generation of newcomers who are most directly confronted with the culture conflict generated on the one hand by their link to the traditional patterns of their parents and on the other to their exposure to the new urban environment. . . Much has been learned in the experience of the Western world . . . about the problems of aculturalization and assimilation in the urban setting. Similar problems are in evidence among the in-migrant populations in Asian cities. (ref. International Union for the Scientific Study of Population, London).

p. 42 It is . . . highly debatable . . . whether the Western outlook, so characterized, is an antecedent or a consequent of industrialization and urbanization or something of both; and also as to whether this outlook . . . really is an ingredient of economic development. It is conceivable that the differences between Asian and Western outlook may produce somewhat different types of industrialization and urbanization, or interpersonal and social relations arising therefrom. It is also conceivable that much of what has been written is the product of premature generalization based on limited observation of Western experience.

p. 44 In general Asia can be and is more mindful than was the West of personal and community hardships arising from industrialization and urbanization. The extent to which these problems can be ameliorated however is another matter because of limited resources and difficult decisions which must be faced in respect of social as compared with productive capital investment. On the basis of the Western experience, Asian countries would do well to anticipate that increased industrialization and urbanization are likely to produce significant cultural changes and changes in personal behaviour and thought.

United Nations, ECAFE seminar
Urbanization in Japan
by Prof. Eiichi Isomura, Dept. Sociology, Metropolitan University of Tokyo

p.14 In 1950 the Japanese Central Govt. set out to instruct the Statistical Standards Bureau of the Cabinet to launch a plan on the establishment of urban areas based on the overall or comprehensive fields of functions...The results...were publicized by the Cabinet in March 1954. The Definition of Standard Metropolitan Areas. The standard Metropolitan area represents an area composed of cities together with their bordering or surrounding cities, towns and villages, which maintain striking city-like characteristics and are tied up to a pivotal city with economical and social inter-relationships. Accordingly the Standard Metropolitan Area can be established in principle apart from the conception that a city, town and village be set within an area of administrative boundaries of its own jurisdiction. The standard of decision of city-like characteristics of towns and villages: (1) the pop. density should be over 170 inhabitants per square kilometer; (ii)out of all households in the specific areas the number of agricultural households should not exceed 50%; (iii) out of the number of passengers in those specific towns and villages, on a monthly average basis, those passingers going to a pivotal city should form 20% of the whole number of passengers. Alternatively there should be, also on a monthly average basis, over 7 telephone calls to the pivotal city, the latter communication density); (iv) the successive approximate to a pivotal city (note, by J.T.: I have no idea what this means).
p.26 In its consciousness that a set-up of multi-divided and independent communities require too much administrative expenditure and eventually will impose a heavy burden of taxation of the inhabitants, the Japan Central Government set out to encourage the amalganation of small towns and villages for a limited period of two years starting from 1954...nearly 2000 towns and villages disappeared with their merger into others. On the other hand in many cases the towns and villages around a big city were amalgamated into a big city...This is the reason why a Japaneses city of recent days embraces ...a comparatively wide expanded agrarian land and population...

United Nations, ECAFE seminar
Human and Social Aspects of Urbanization: effects of urbanization on family life in ECAFE by the UN Bureau of Social Affairs

p.3 Much of the urbanization that ocurred in Asia in the past was not, as in Europe, an expression of economic growth and re-orientation but rather an expression of foreign commercial, political and administrative and military interests. Secondly the difference in timing is of vital importance. There is no reason to assume that the pattern of development will necessarily or desirably be the one followed in the West. Indeed the situation is quite different if only for the reason that Western development has already taken place and the present end-products are clearly evident. Improvements in sanitation, education, communications, labour policy, social services, etc., that developed in a slow and more or less experimental fashion in Western countries are being deliberately taken over in their end-form in South and S. E. Asia, while there is at the same time a conscious effort to avoid the mistakes. The time lag, potentially of great value, does however present some disadvantages. The main one perhaps is that vast population increases have preceded economic development. The sheer magnitude of the populations undergoing rapid industrialization and urbanization multiplies and complicates the social consequences of economic development.
p.6 In pre-industrial societies the family is a social and an economic unit. Socially the welfare of the aged and the handicapped, educational functions and the care of the sick, the performances of certain religious rites and many other duties are a family responsibility. At the same time the family is a productive unit, undertaking collectively the various activities that support all its members. In a money economy... the earning of a livehihood tends to become a responsibility not of the whole family but of individuals. With the loss of this fundamental economic function other roles of the family may also be affected. It becomes increasingly typical for married couples to set up house for themselves...Parents, parents-in-law, unmarried and widowed brothers and sisters, uncles and aunts tend to be excluded more and more from the family household. Urbanization usually accelerates and accentuates the change. Housing problems in the towns limit the number of family members who can live together; wage employment is the antithesis of family production. The smaller urban family thus loses its old self-sufficiency. It must rely increasingly on help and support from outside the family circle...The town dweller's family can no longer cope with the consequences of unemployment, sickness and old age...Education, entertainment and the many emotional satisfactions derived from religious ritual and large family gatherings for special events must either be provided by outside associations or not at all.
p.13 It cannot be repeated too often that rural-urban migrants do not by any means constitute a homogenous group. Some move as individuals, others in family groups. Although the impact of the change, of the sudden introduction to urban life, is likely to be sharp in all cases, it may be useful to divide the urban immigrants into three groups: unmarried individuals; breadwinners leaving wife and children behind; and the conjugal family consisting of father, mother and minor children. In the first case the family problem is least serious...His departure may have weakened the cohesion of his family and, by example, may affect the cohesiveness of other families in the village. The migrant himself will have far greater demands placed on him for adaptation and adjustment..."The individual who breaks his family ties to such an extent that he practically loses contact with his family has no roots and therefore is unstable and dis-social" (En Mesa Redonda, Testimonio no.54) Bogota)...In the case of the man leaving his wife and children in the village...the wife is likely to suffer most. Surrounded as she is by in-laws only, sometimes hostile, any protection she may have had from her husband is no longer available to her. The children would seem to fare best. Still enjoying the affection of mother and grandparents they also have the company of other contemporaries in the village community. The husband's position in the urban area is somewhat similar to that of the bachelor except that his obligations to his family are much greater...One of the great dangers is that of his forming a second quasi-family in the town..."The instability of the urban family results in increasing numbers of deserted mothers and abandoned children" (UN) When the entire family... makes the move to the town the full impact of urbanization is directly felt by each member...Often the family does not know whether its stay in the town is going to be a permanent one...The incentive to form attachments in the city, to become integrated into urban life, cannot be strong. Hence the effort may not be worth while and the family become unstable, neither urban nor rural...Very often the mother will also work. This indeed may be part of the reason for the family's migration...The employment opportunities for women...are expanding; Economic activity by children is very widespread and even traditional in many countries of the region. In the village the child, within its limits, contributes to family production "the child in such a society is simply protected from exploitation for another's gain. But with the impact of the money economy...the employment of children...can be used by outsiders for their own ends without regard to the children's welfare" (UN)...

p.20 The most radical form of family dissolution, death, has the most terrible effects on city children. In the village the death of even both parents will not rob a child of all affection and security. Relatives of various degrees will protect and rear the orphan. In the city...the orphan will try to fend for himself, economically and socially... In a discussion of rural-urban migration emphasis is often placed on the contrasts... This must not be allowed to obscure the many similarities. The village is becoming increasingly urbanized and the towns still have many characteristically rural features...There is a general process...It involves increasing familiarity through general use with all types of manufactured goods ranging from sewing machnies to metal cooking utensils it also involves the mechanization of some village crafts and increasing contact with the urban world through the cinema and radio...
p.21 Certain features are characteristic of many towns. By and large they tend to expand faster than physical facilities or social services are or often can be provided. Therefore "the rapidly developing industrial city in this part of the world has recapitulated all of the evils through which the industrial city elsewhere has passed. Housing conditions, working conditions, recreational facilites and sanitary conveniences have all been incredibly bad and food has been scarce and unwholesome." (Davis) These conditions are not simply the results of urban life. They reflect at least to a degree the extent of rural destitution and agricultural stagnation...
p. 26 It is the State, the municipal, local or national government, that is asked to bear the major burden of relieving hardships caused by conditions and hazards over which the individual has no control, such as unemployment, old age, and so on. The rate at which it assumes the responsibility and the manner in which it is carried out will to a large extent determine whether the changes that urbanization is producing in the family will transform it into a new but viable form.

United Nations, ECAFE seminar

Human and Social Aspects of Urbanization in Asia: the social implications of industrialization and urbanization
by J.D.N.Versluys (UNESCO)

p.2 (Usually the) villager knows somebody from his own village who is living (in the city) and he goes there and clings to him. Indeed in all the five studies prepared for UNESCO we find this very important factor. In many cases the newcomer lives for months with his fellow villager and perhaps longer, expecially when the latter is a relative...It will depend on his individual adaptive capacity how soon he will feel 'at home' but there comes a time when he will meet another newcomer and will realise how much he already knows as compared with the other man. What has happened to him meanwhile?...Most important perhaps is his total dependence on money which formerly played a minor role as he was living largely a subsistence economy...No work: no money, no food. This may seem obvious but for a very large number of village people, sheltered in the joint family, it is not... The villager...will miss his family and the gossip of his village and his quiet work in the fields. And he is starting to build up an idealized village that, for years to come, will probably be the image in his mind of a far from ideal place which he had to leave because of sheer poverty and distress. If asked if he likes his new way of life he will most probably emphatically deny it, pointing at the bad housing conditions and the unhealthy surroundings, adding however that he cannot go back...If he left his family behind he will probably have found a place where to live, inferior to his last place but enabling him to let his family join him...However he is still convinced that he will go back to his village...whenever he has saved money to buy some land. But his children are going to school, and the schools are better than back home...then his sons start earning and the family income grows so that it would be a pity to go back just now. Most probably he will never go back...But his children have become real city folks...This might be the study of a successful migration.

p.4 How far does the city affect the migrant's beliefs and habits?...He has learned the quite novel distinction between 'work' and 'leisure',..his way of thinking is 'modern' and he says he is broadminded as regards matters of caste or other social differentiations. Nevertheless he will see to it that his daughter marries a young man of no inferior caste to his own. In fact in many cases we may find that his professed attitudes and his actual behaviour do not quite coincide....From the Dacca and Bangkok studies it became clear that his religious duties were carried out faithfully, perhaps more so in the city than in the village. The social control in the villages does not seem to be stronger as regards to this matter than the 'Prayer Committees' operating in the Dacca factories. In Bangkok we found that the beautiful temples greatly appeal to the migrants and from Bombay it was reported that ... the total number of those who follow religious practices has not decreased. In the Delhi study...a direct correlation between economic distress, social disintegration and loss of religious practices came clearly out...

p.5 When the migration succeeds it is found that new social connections are formed, thus replacing the organic links of the village community. This point is especially stressed in (Djakarta)... "social control in the city does not differ much from that of the rural areas." In general his description of Djakarta city gives the impression... of an agglommeration of villages, each with its own character, each also physically showing far more the village features than the city aspect. The kampongs of Djakarta with their trees and flowers are certainly more friendly places than the slums of Bombay or Calcutta...The societies for mutual aid, money saving, etc. also certainly help to bring about a feeling of belonging...Similar efforts are reported in the Dacca study where the Prayer Committees seem to exercise a strong social control, whereas in Bangkok only informal groups seem to exist. Nevertheless such informal groups are extremely important, and the individual can rely on his group, may borrow money without interest and find, in general, support in the struggle for life....

p.6 The less the social cohesion the more easily the individual is induced to doing things he would not have done in his normal social surroundings.

p.7 The decline in interest in religion as reported by the representatives from India and Pakistan as regards the educated classes, where the break-up of the joint family progresses rapidly and traditions of centuries are given up by the younger generation. But this 'city influence' and its effect of 'sophistication' is not very strong among the lower strata of society in Asian countries as their cross-cultural contacts are very limited...The creative element in city life...should always be remembered even if one has to admit that the city is also the only place where mob rule and dictatorship can develop...However the migrants to cities in Asia are...only seldom attracted to the city...The large majority of the migrants are pushed to the city by poverty in the village, lack of land, or debts. They do not go to the city because they think it is an attractive place.

United Nations, ECAFE seminar

Preliminary Report on Agenda Item 2 (Economic causes and implications of urbanization
Statement by G.V. Subba Rao, (ECAFE Secretariat)

p.3 Economic development...results almost invariably in an accentuation of urbanization.. As much as there is a gain in efficiency due to the expansion of the size of a firm, there is also a similar gain in the juxtaposition of producing units if these are related by what are called economies of industrial linkage. These benefits of localization apply as much to small units of production as to large factories... Related to these points is the other proposition that urbanization...in the early stages of modern economic development has generally tended to grow at a faster rate than population growth or growth of the economy...At least two stages can be distinguished...In early stages industrialization has generally come to concentrate on the development of consumer goods and light industries. These are more market and labour oriented than raw material or power oriented ... Thus industrialization tends to accentuate the growth of the existing urban centers. The second phase... the development of heavy industries...tends to get away from the location pattern of the pre-industrial...phase...In several Asian countries all these...factors are operating.

p.5 The fact that industrialization has generally tended to move ahead of economic development...means that demands for less productive projects will be made on the scarce capital resources of these economies right in the early stages of their development...This burden is similar to the so-called demographic burden (widening of gap between death rate and birth rate) that several under-developed countries are expected to face in the transitionary stages of economic and industrial development...

p.6 It is probably true to say that Asia is over-urbanized in relation to its degree of economic development. At comparable levels of urbanization, the developed countries of to-day had a correspondingly greater proportion of their labour force engaged in non-agricultural occupations...Several economic and non-economic causes have contributed to this situation of relative over-urbanization. First...there is the <u>push factor</u>... The penetration of cheap manufactured goods from abroad leading to a steep decline in traditional non-agricultural ocupations. Again in the feudal and semi-feudal setting of several Asian countries, the pressure on land resulted...in the growth of a labouring class which started to look for alternative employment in cities and towns... Though the push factor predominated, the pull factor of urban centers also operated to a limited extent...The pull was to the administrative centers,port towns other transport points... The implications of relative over-urbanization of serveral Asian countries should be carefully analysed. An excessive volume of rural-urban migration and consequent over-urbanization of these countries may not last for long. An overstraining and breakdown of the relief function of the cities may bring the process to a halt. Alternatively an accelerated and more rational pattern of economic development in both urban and rural areas may restore a healthy equilibrium between the two. In the transition however urban misery and rural poverty exist side by side...both unemployment in the cities and under-employment in the rural areas reflect the same factor, namely the economic underdevelopment of these countries in relation to the potential human and physical resources at their disposal.

United Nations, ECAFE seminar

Report on item 3 (e) of the agenda. Problems of labour stability, the lack of vocational training and productivity, prepared by P.S. Narasimhan. (I.L.O.)

Summarizing previous discussion the author states that two broad conclusions had emerged. The first was that in most ECAFE countries, until recently, towns had expanded faster than warranted by the growth of economic opportunities, with the result that workers who drifted in from rural areas found jobs only in casual employment, i.e., service occupations and trades such as peddlers, rickshaw-pullers, domestic servants, bootblacks,etc, indicating stagnation rather than economic progress as in more advanced countries. Secondly, that to reduce the excessive pressure on land, there had to be a steady expansion in the manufacturing industries. There was a good case for encouraging the growth not of a few giant cities, but of a number of medium-size towns scattered throughout the countries and serving surrounding rural areas. Rural labor flowing into the towns gives rise to the problem, both psychological and technical, of adapting to modern techniques.

The author then reviewed factors leading to instability, lack of skill, and low levels of earnings of workers entering urban labor markets, and problems relating to the employment of women, young persons, and children. He described the ways in which the I.L.O. was providing technical assistance to some of the countries in developing machinery and techniques, in promoting vocational training and apprenticeship schemes, and in developing productivity programs suited to Asian countries, particularly ECAFE countries.

The following conclusions were drawn:

(a) Workers transplanted from rural to urban areas have no training for or experience of industrial work, and their productivity is very low.

(b) Conditions of housing and social services in towns are usually inadequate and there is a surplus of unskilled labor.

(c) Policy measures must take account of characteristics and requirements of male and female workers, and especially of juveniles.

(d) Short-term measures to improve conditions include diffusion of accurate information concerning living and working conditions and employment prospects in towns. Longer-term measures include expansion of school systems with greater emphasis on vocational training, the development of vocational training centers in cities, extension of employment services, and regulations of employment conditions through appropriate social legislation.

(e) Measures in the field of manpower policy need to be devised and applied as integral parts of more general policies aiming at economic development and higher levels of productivity and employment.

(f) There is scope for improved utilization of resources in industries through the application of modern methods of management.

(g) Improved productivity can be made to contribute to capital formation and to the expansion of employment opportunities.

(h) Productivity programs should seek to secure the interest and support of both labor and management on a mutually advantageous basis.

(i) Productivity programs should be instrumental in providing a broad range of educational and consulting services.

(j) Joint "Productivity Centres," with government support, can usefully serve as focal points for the organization and execution of productivity programs.

UN Narasimhan - 2

In India, in a number of industrial towns, i.e., textile and coal-mining, a permanently settled labor force already existed. But here a new problem had emerged. Because of recent legislation employers are obliged to provide certain extra benefits to permanent workers, making them reluctant to hire new workers except on temporary basis.

In India the government has been trying to introduce in schools the system of basic education which will give pupils some elementary training in simple crafts. In Pakistan, there are definite plans to introduce such a vocational scheme. Something has to be done in ECAFE countries to promote mental attitudes which will attach as much value to manual skills as to intellectual attainments. Training programs are divisible into three: training for literacy, training for skills needed for economic development, and training for vocations such as those of teachers, lawyers, engineers and doctors.

Workers' organizations can play an important role in adapting incoming rural workers to employment in industrial establishments by education programs, by suitable training schemes, and by taking full advantage of welfare facilities and social legislation.

The whole question of housing was discussed in its broad aspect as part of the program to develop a stable and an efficient labor force in urban areas. The proportion of total resources used for housing has to be decided in the light of the overall priorities for utilizing the available scarce resources.

United Nations, ECAFE Seminar

Rapporteur's summary report -- item 4 (3), Policies for Town and Country Planning, prepared by Ernest Weissmann.

The rapporteur introduced the subject and discussed: (a) the relationship between urbanization and the physical environment; (b) the role of housing, building and community improvement in the process of urbanization; (c) physical or environmental planning; and (d) the regional planning approach as a means to guide urbanization.

Urbanization and physical environment

Asian cities are attracting large numbers of rural people. Drift from the village is due to growing pressure of people on food producing land, to a change from a predominantly peasant economy to modern industrialized production, and to the contact of developing areas with the expanding world market. The rapid pace of this process of urbanization in recent years has caused blight and congestion, while at the same time the rural environment continues to deteriorate. The urbanization process is particularly intensive in countries which have recently gained independence; whose economies have changed from colonial to national economies, and where the net increase in population is reflected mainly in the growth of cities.

With the development of trade through better transport and communications of a wider range and capacity, the urban/rural balance of a particular region tends to become increasingly influenced by the demographic, economic, social, cultural and political factors outside that region. World-wide requirements of production, consumption and trade thus become important elements in urbanization everywhere. The pace of industrialization and the urban/rural relationship can be changed greatly by automation and nuclear energy.

The deterioration of the urban environment and the problem of housing in Asia are perhaps worse than in other parts of the world. Urbanization is rapid, intensive and pregnant with social problems. Its symptoms are social maladjustment and physical change that leave in their wake slums and blight. Approaches, methods, and techniques are being sought to cope more effectively with the changing settlement pattern and to achieve a more balanced development through planned location and growth of industry in relation to other fields of production.

Housing, community improvement and building.

The improvement of man's physical environment is a visible expression of a rise in living conditions. It is composed of the family shelter and its environment including a number of amenities, services and facilities which provide the link between the family and the group. The problem is staggering under the impact of industrialization and urbanization. Enormous needs must be met with small outlays.

Governments are assuming increasing responsibility for financing of housing and community improvement programs as part of their general social and economic policy. Resources in materials, plant, manpower and funds that can be made available for current and future housing programs are being assessed in the light of their contribution to full employment and social betterment, to economic growth, and better living conditions.

Housing and community facilities are beginning to be considered as basic to economic development.

Provision of adequate housing and community facilities must accompany, or even precede, resource development if obstacles to economic progress and the high social costs of haphazard urbanization are to be avoided. There appears to be conflict in the sphere of national policy formulation in the developing countries between the social and the economic approach, with the development enthusiast seeing the problem in terms of scarce capital resources which should be diverted to "more productive tasks."

The relation of housing finance to economic development involves many complex problems such as the share of investment funds which the countries can and should allot to housing and community improvement programs in the interest of balanced economic growth and stability. It calls for establishing priorities among the different social programs. Housing is involved in the process of saving and investment in long-term patterns. People will save for better housing who would not make their savings automatically available for capital formation otherwise.

In connection with housing and community facilities for people in the lower income groups it is most important to foster and improve the production of local building materials, both as cottage industries and on a larger scale. To reduce cost of urban housing and to improve its quality where intensive shortages exist, productive building and building materials industries on large scale are necessary to cope with the required volume at costs attainable.

Housing programs cannot mature successfully unless house-types adopted are related to the economic, social and physical conditions of a country or area. Housing codes should aim at establishing guiding principles, and the standards of performance required from a dwelling should be health, safety and convenience.

When resources are scarce, great emphasis should be laid on community and regional planning, and on the provision of utilities, services and facilities, rather than on a limited number of well equipped houses in poor environment.

While no government has sufficient resources to provide all housing and community facilties needed, the people may have them. Practical solutions should combine their skills and resourcefulness in rational application of local materials, social advantages of group work, and the best use of assistance from public authority. Such projects have often become focal points for local action which has usually extended into other fields of improvement.

Internal migration cannot be arrested or turned back. The question, therefore, is how can nations adjust their planning and turn this population drive into a positive contribution to social and economic development.

Better housing, social and cultural amenities and more adequate facilities in rural areas may help to slow down the drift to cities and reduce the city's psychological impact on rural people. Bringing industry to rural areas would be effective by injecting new sources of livelihood. Benefits would then be brought to rural areas in the way of higher family income, better community facilities, more desirable environment, thus combining advantages of rural living and industrial employment. Central planning could better coordinate with individual and group initiative.

It is the task of physical or environmental planning to define the different components of a specific development program by assessing and recommending zones for industrial, agrcultural, residential, social and cultural uses, and by establishing a rational pattern for transport and communications, for power supply and distribution, and other utility networks as part of the overall program.

Discussion on land problems indicate that enactment of legislation where it it does not exist, and its proper application where it does exist, is essential to avoid speculation with urban land at the expense of the lower income groups and the recent imigrants in particular.

Physical planning is a continuing process, long term, and usually carried out (if at all) by others than those who made the plans. It is important to establish the necessary planning organization, to provide it with the required staff which often needs to be trained, and to set out the methods and procedures and to secure the funds and legislation -- then to draw up a master plan that will not continue to be supported by a planning body. Close relationship between the physical planning organ and the economic and social development units in the government is a primary condition for success.

Comprehensive regional planning and development. There are two new factors which make it unnecessary to repeat the costly mistakes of the past that produce industrialized countries at the expense of urban environment. One is the fact that present technology offers a wider range of possibilities for region wide distribution of population and for community structure than was formerly possible. The other is the increasing role of government and public responsibility in the planning and development process.

Regional planning offers a suitable framework within which development projects of national, as well as of local, significance can find their proper place. In the past it has been limited to re-development of metropolitan areas or to river valley development, but now it offers opportunity to tap wider resources with the introduction of nuclear energy in a wide range of geographic locations.

Urbanization does not necessarily have to follow the pattern characteristic of already industrialized countries. Comprehensive regional planning is equally important for redevelopment of metropolitan areas for the opening up of new resources, and for the reconstruction of rural regions.

Not only does the social structure of the village generally cease to dominate and guide the new city immigrant, but the traditional social structure of the host city itself also changes under the impact of industrialization. Research date on the city's role in contemporary society, on its function within a region, and on the type of physical environment conducive to a more balanced mix of urban-rural cultures are still lacking.

A number of large new cities are being planned and built in Asia. Integrated (economic, social, technological, cultural, etc.) research into consecutive phases of design, production and actual use could be carried out in these new cities simultaneously in one location, at the drafting board, on the construction sities, and in the new homes, work places and neighborhoods. Construction and maintenance costs should be lowered as a result of such research and the new communities may become better adjusted socially and gain in cohesion.

In Asia, numerous examples of valley development offer unique possibility for regional land use research and formulation of policy. The effect of the location of new and existing communities in relation to economic, technological and human resources could be observed. A proper balance could be maintained by decentralization of the human scale of small communities and the advantages of metropolitan concentrations in terms of culture, art, education, and other amenities, services and facilities.

The increasing role of public authorities and public responsibility concerning matters of housing and physical environment are now generally accepted functions of government in Asia. The Seminar felt that bold and imaginative action by the Asian people and their governments combining industrialization and orderly urban growth, agricultural reconstruction and community development, and social and physical planning of the local, regional and national levels could bring about a more desirable urban/rural relationship without the physical hazards and social ills which are the usual symptoms and characteristics of over rapid urbanization.

Other main parts in the Weissmann's address have been summarized as follows: In some developing countries the large city may be the product of economic development oriented towards foreign countries rather than to the needs or potentials of national economic development. Many less developed countries are "over-urbanized" in relation to their national productivity. The symptoms are inadequate housing and services, lack of sanitation and presence of squalor, disease, and high mortality in urban areas. This is often accompanied by social disorganization.

UN Weissmann - 4

Urbanization in the West was based on industrial production and a monetary economy. In developing countries, particularly the Far East, cities consist of a small "urban" area serving the elite, but the rest is really an agglomeration of villages retaining rural characteristics. The slow pace of "urbanization" of the immigrant population is due to the fact that the population growth of cities has out-distanced economic development. The sudden contact of rural subsistence economics with urbanization produces social maladjustments as well as slums. Improvement of the physical environment is a manifestation of a rise in living conditions. Programs designed to prevent or repair ills connected with the explosive growth of cities are hampered by lack of investment funds, fast growing populations, and increasing immigration.

Housing is a type of capital formation that both encourages and strengthens long term patterns of saving. People will save for better housing who would not otherwise make their savings available for capital formation.

It is important to foster and to improve the production of local building materials. House types are not likely to be static but to change with social and economic advancement. Housing codes should provide for such changes by establishing performance standards of health, safety and convenience rather than by fixing sizes or construction methods.

When resources are scarce, emphasis should be laid first on adequate community and regional planning and the provision of utilities, services and facilities. Environment planning should normally precede economic action. In formulating a development program, all socially justifiable requirements must be measured against the natural, economic, technological and human potential of the area. The requirements and the means must then be related in terms of space and time. The placing of a program must be set by economic, social and political considerations.

The task of environmental planning is to define in physical terms the different components of the development program and to establish the pattern of location by a rational system of transport and communication, power and utilities. Usually the social and physical setting are considered too late and too little is done about them. Land legislation is essential to avoid speculation at the expense of recent arrivals from rural areas.

X

United Nations, ECAFE Seminar

Conclusions.

Urbanization in most of the countries of Asia and Far East is leading to serious problems due to:

a. Larger urban population than is justified by present levels of agricultural and non-agricultural productivity.

b. In most of smaller countries there is a "primate" city, 5 to 10 times the size of the second city. These cities are the product in the main of economic development oriented essentially to one or more foreign countries, rather than the result of indigenous economic development.

c. The growth of many cities was due to:
Low land-population ratio arising from rapid population growth in relation to agricultural resources.
Disruption and disorganization produced by last war, and ensuing political changes. Many cities of Asia are choked with refugees.
Lure of urban existence as result of military service exposing many to city life, as well as migratory refugee flow.
Actual exhaustion of natural resources in some areas.
Seasonality of employment in agriculture which creates migratory flow to cities

d. Primate city may have paralytic effect on development of other urban places and tend to be parasitic in relation to national economy. Such a tendency may detract from growth potential of other cities and produce further concentration in the great city.

e. Characteristics of many cities are mainly two: 1, the Western type area, and 2, the indigenous type area consisting of an agglomeration of villages.

5. Cities over-urbanized in social and physical aspects as related to economic development. Symptoms are inadequate housing, almost complete absence of mass sanitary facilities, the presence of filth, squalor, repugnant odors, disease and high mortality, high illiteracy with little or no access to education facilities.

Countries are faced with choice between allocating resources which are limited towards amelioration of immediate problems, or towards investment in long-run social gains. Some countries are seeking to decelerate rate of urbanization or to induce swelled urban populations to return to rural areas by action to increase agricultural productivity and incomes, including facilities for rural credit and increased utilization of cooperative methods, efforts to make village life more attractive, the stimulation of village and cottage industries, the decentralization of new industrial development, improvements in communications, resettlement programs including opening of new agricultural lands, irrigation, etc., land tenure reform, and general national and regional physical planning though this is at present on a limited scale.

The Seminar set forth the following main issues as: Economic aspects, Social aspects, and Physical and regional planning.

Economic aspects. Effects of urbanization favorable to economic progress in general are occupational diversification, greater opportunity of occupational and social mobility, and dynamic influence of technical progress which cities reflect through contacts with other centers of economic progress.

Urbanizations brings about increased productivity by broader and more easily reached markets.

Money incomes are generally higher in urban areas although there is some question whether real incomes are actually higher in relation to cost of living.

UN Conclusions - 2

Urbanization imposes a heavy requirement for capital formation for public utilities and housing.

From economic and other points of view, urban centers must be viewed as closely linked with rural areas in a single interdependent whole. Urban misery and rural poverty are two sides of the same coin -- economic under-development.

Industrial development has been frequently modeled on western pattern without full utilization of available local manpower, and also located without interests of social welfare considered.

Distribution of industry should be studied as to advantages of new industrial townships, expanding existing centers, or making new patterns of rural dispersal.

Small industries need guidance in forming voluntary trade associations for procurement of raw materials, marketing and research.

Social aspects. Social disorganization in urban areas occurs in family changes from large, joint-family system to small family system, in changes in religious beliefs and practices, in changes in social stratification, including caste and class lines. New controls emerge which are institutional, i.e., police, courts and penitentiaries, welfare and health agencies, social legislation and social security to protect functions of family, etc. To the extent that indigenous population live in villages with urban framework, these populations remain isolated and tend to retain "folk society" characteristics.

Personal disorganization is manifest in crime and juvenile delinquency.

Family protection and modes of throught disappear or are modified and need to be replaced by urban institutions, such as health and welfare agencies, schools, social security provisions, care for aged, unemployment compensation, public recreation, etc.

Community development programs offer integrated community growth and will serve to improve level of living. It involves participation by people in effort to improve their own conditions, and encourages self-and mutual help programs.

Education facilities must keep pace at every stage with urbanization, on the primary, secondary and vocational levels, with periodic checks on population changes and existing services.

Educational facilities and curricula should be oriented in special cases for adults and children of recent rural origin who may have a language barrier. Such programs could include aid in dealing with new problems of industrial life and family living.

Additional influences are recreational, such as the cinema, public libraries museums, art galleries and the like.

Physical and regional planning. Housing is a responsibility of government allied to its general social and economic policy. Production and use of local materials, both through cottage industries and on a larger scale, may contribute to the reduction of the cost of housing. Further contributions can be made by mobilizing self-help and mutual help in labor and skills for building and improving homes. Housing standards are coordinate with standards of community planning and services and facilities, such as sanitation, water, and transpprt to and from work. When resources are scarce emphasis should be on the provisions of facilities. Good housing adapted to local needs may help to slow the drift towards the city.

Regional plans establish a rational pattern in the overall program. They can reconcile material production with human welfare, and help to establish a balance in the urban/rural relationship of a developing area.

United Nations. Technical Assistance Programme. Draft report of Seminar on Housing through Non-Profit Organizations in Asia and the Far East, Copenhagen, Denmark 31 July - 27 August 1956. Organized by the United Nations, the International Labour Organisation, and the Government of Denmark. Copenhagen, 1956. 69pp.

This is a provisional document with notes on participants' monographs for their use only.

Section B, Housing in Asia, reviews social housing in Asia before World War II, Progress in governmental housing activities since the War, and current Housing policies, Rural housing, Schemes for the resettlement of regugees and other displaced persons, New communities, Rent control, Housing of employees, Urban land problems, Other factors affecting progress of housing: shortages of materials.

Almost every Asian country has now created some kind of organisation for government-sponsored housing activities, a usual pattern being the entrusting of government policy to a central "Housing Ministry" which may be associated with local government agencies. Housing policies are in general to improve housing under government direction and to encourage cooperative schemes. In India the central government has accepted responsibility for financing housing programmes in industrial centers, leaving state governments to concentrate upon housing in rural areas. The Indonesian government approaches rural housing with solutions of aided self-help methods, health education, and the introduction of improved simple building techniques. Singapore builds through the Improvement Trust two main categories of housing: low-cost permanent housing, and low-rental semi-permanent housing. Loans to the Trust are furnished by the government to carry out this policy. In Malaya the government has turned its attention to low rental housing with emphasis on "hire purchase" plans and aided self-help schemes. In Japan the policy is to improve the quality of housing and to make wage-earners' housing expenses reasonable and to promote construction of non-combustible buildings.

Rural housing is being given special attention, in many countries. In India, within the Central Ministry of Works, Housing and Supply, a Rural Housing Cell has been established 'with the object of studying various problems in the field and for the purpose of technical guidance and assistance to the Community Projects Administration State Governments, and other interested authorities, in the matter of evolving better designs, layouts and methods of construction and better utilisation of local materials.'

In Burma, the National Housing and Town and Country Development Board is carrying out a 'model village' programme. The policy is to set up at least one model village in each district with these objects:

"improve not only the economic conditions of the people living in villages but also the condition of their health, education and standard of living as a whole;

"to ensure that the national programme for better housing is not confined to towns only but diversified to embrace villages also;

"to give a lead to remodelling of other villages in the neighbourhood in line with the model village constructed;

"the model village should retain its national character; materials for construction should be mainly timber and bamboo which are locally available."
Twenty seven model villages have so far been started."

"In Malaya, village improvement has been in the hands of the Rural and Industrial Development Authority (RIDA); with the establishment of the Ministry of National Resources and Local Government, it is likely that there will be increased emphasis in this aspect of housing in Malaya. In Indonesia, health

education and the introduction of new and improved techniques are the main objectives of village housing. These are being introduced by mobile demonstration teams within the framework of the national community improvement programme."

New communities.

"Quite a number of Asian countries have begun to build, or are planning, "new towns". These are usually satellite communities a few miles (five miles or so) from a large existing town (often the national capital) rather than completely new and self-contained communities. Among these are Petaling Jaya, four miles from Kuala Lumpur, Malaya, built to accommodate some 8,000 families, and Yankinmyo, a new suburban town five miles from Rangoon, now accommodating 1,230 families. In Malaya, following the success of Petaling Jaya, satellite communities on a smaller scale are planned for other centres.

"In Indonesia one of the ten satellite towns, Kebajoran Baru, around the capital Djakarta, is being developed. Kebajoran Baru has a population of 50,000 and is planned for 60,000 inhabitants. In the Philippines, Quezon City was developed initially by the Peoples' Homesite Corporation to house people from nearby Manilla. Proposals for establishing one or more new towns in the New Territories are being studied in Hong Kong, while the Pakistan Government is to build a new Federal Capital on a site near to Karachi. The Singapore Master Plan, published in 1956, envisages the development of three new towns on Singapore Island during the next 20 years -- Woodlands (30,000 people), Bulim (85,000), and Yio Chu Kang (35,000). India has had considerable recent experience in the development of "new towns". These have included Chandighar, capital of Punjab. Many Indian towns were established as centres for refugees coming from Pakistan.

"In a few cases, the most notable being that of Singapore, the establishment of new communities results from the preparation of a master development plan. The Singapore Plan, which was submitted to the Government in November, 1955, has been the subject of a recent public inquiry at which objections lodged by persons considering that their interests were injuriously affected by the Plan were heard. In Burma, a Greater Rangoon Plan is being prepared. In Japan, following the enactment of the Municipal Adjustment Act, 1956, work has begun on a master plan for Greater Tokyo.

"Work on the masterplan of Greater Djakarta has been started in 1953 with the assistance of UNTAA.

"Rent control.

In most Asian countries, rent control measures introduced during or immediately after World War II are still in force. Sometimes, pre-war dwellings built by a non-profit housing agency, are among the properties still controlled. It is questionable how effective these measures are as rooms or cubicles in dwellings are frequently sub-let and the taking of key or "tea" money is common. In privately owned property, it seems that the principal tenant (who may not even live in the dwelling) mostly benefits rather than the families actually occupying the rooms or cubicles. The application of rent control to non-profit housing creates serious anomalies between pre-war and post-war tenants and can hardly be justified. A few countries, for example Hong Kong, are revising rent control measures; but in others, though the present state of things is generally accepted as unsatisfactory, political support for revision is lacking.

"Housing of employees.

In most Asian countries, a significant part of the national housing programme is devoted to the housing of government employees and similar groups. The accommodation provided is usually subsidised; this has helped to make government employment attractive and has given stability during difficult years of reconstruction and political development.

UN Seminar on Housing - 3

"A number of countries also give special attention to other workers, especially the employees of larger industrial enterprises, plantations, mines, etc. In Malaya, this interest consists largely of regulating the standard of housing provided, especially on plantations; this is a responsibility of the government's Labour Department. In Indonesia, industrial housing and the housing of labour recruited from a distance is controlled by the Ministry of Labour.

"In India, where the provision of housing for industrial workers by employers is an accepted practice, under the Subsidised Industrial Housing Scheme the central government is giving considerable financial assistance to housing by employers as well as by cooperatives of industrial workers, state governments and public authorities generally. The Scheme was first introduced for workers covered by the Indian Factories Act, 1948, but now also includes mine-workers (other than those in coal and mica mines who are covered by a separate scheme). Loans and grants (i.e. subsidies) are made towards housing schemes by employers, cooperatives or public agencies the terms varying according to whether the recipient is a State Government (50% loan, 50% grant), a cooperative (50% loan, 25% grant), or an employer (37-1/2% loan, 25% grant). The maximum cost of each unit is specified; it varies according to whether the scheme is in Bombay or Calcutta, in other towns or in smaller communities, whether it is for one or two room dwellings and whether it is in a single or two storey building.

"During the Indian First Five Year Plan period, about 85% of the housing built under this scheme was by State Governments, about 13% by non-government employers and under 2% by cooperative societies. About a third of the money alloted by Central Government to housing under the Second Five Year Plan has been earmarked for the subsidised Industrial Housing Scheme. Assistance in the form of interest-bearing loans will also be available to planters to meet 80 per cent of the cost of housing workers on plantations governed by the Plantation Labour Act, 1951.

A number of factors have been listed as affecting the progress of housing programmes in Asian countries. Reference has already been made to land problems. The need to import building materials -- particularly cement, metal goods, sanitary ware, and electrical equipment -- which tends to increase as modern building methods are introduced, has affected or is affecting housing progress in a number of countries. Singapore's complete reliance on imports of steel and cement renders the progress of its housing programmes vulnerable to supply and transport delays, and speculative price increases have resulted from consequent temporary shortages. On the other hand, as an international trading centre Singapore, and even more Hong Kong, have been able to benefit from the general world wide expansion in the production of materials like cement and from new technical developments.

"In Indonesia, many kinds of building materials have to be imported, including about 70% of the cement, most of the sheet lining and roofing materials, much of the hardware and all the window glass used; the building materials situation is consequently "critical". In Burma, there are also problems in procuring building materials, especially of foreign origin, "which are often very difficult to obtain and many of which simply run out of stock in the course of construction thereby delaying the works and at the same time raising their prices ...". A similar situation has existed in the Philippines where "due to the shortage of foreign exchange, the government imports cement only at intervals and the situation has tended to develop profiteering by dealers".

"Building methods in Japan are changing as the main material used, traditionally timber, is becoming exhausted. Building in reinforced concrete is being encouraged both because of the growing scarcity of timber and because it is more resistant to earthquakes, strong winds and fires. Building in reinforced concrete, however, may be twice as costly as in timber. Most of the cement, steel and timber used is of local origin.

"Many of the Asian countries are relying more on local building materials. Indonesia has a second cement works under construction, lime production on modern lines is being encouraged, and hardboard and asbestos cement products factories are planned or under construction. In Malaya and North Borneo, as in a number of other countries, an expansion of the local timber industry is benefiting building as well as providing a useful export outlet. In Malaya, a local cement industry

has been established. Cement works, a number of which had been damaged during the War and had to be repaired or reconstructed, are operating in a number of other countries including Burma (1), China (3), Hong Kong (1), and the Philippines (3). In most cases, however, local production is still inadequate. All the countries are expanding the production of concrete blocks, clay bricks, concrete or clay roofing tiles, and sawn timber.

"A number or the countries lay emphasis on the "need for research in building materials and techniques, for prescribing standards of construction with due regard to the availability of local materials and the economic use of scarce materials and generally to bring about an adequate reduction in building costs". In Burma, a Building Material Research Institute was set up in 1955. In India, where a Central Building Research Institute has been operating for some years, a National Building Organization was set up in 1954, and a United Nations Regional Housing Centre is being formed. A similar centre, for the more humid countries of Asia, has been set up in Indonesia."

American Friends Service Committee. The Tur'an agricultural project; a report by the American Friends Service Committee. (Community development bulletin, Sept. 1956, vol. 7:4, pp. 79-85.)
Published in London by the Community Development Clearing House, University of London Institute of Education.

In 1950 the Friends introduced plans to improve and to modernise the agricultural methods and practices of the Arab village of Tur'an in Israel. The project was concluded in 1955. In presenting the project to Tur'an a representative of the Ministry of Agriculture emphasized that it would be integrated with the plans of the government for development of agriculture in all Arab villages.

Tur'an was suggested for at least two reasons: "Its extensive fertile soil and level land was adapted to mechanical cultivation. The location of farm land near the main road from Nazareth to Tiberias made it possible for the work to serve as an example to other Arab villages.

"The 1,600 Tur'an villagers own approximately 11,000 dhunums (about 2,750 acres) of arable land. There are fairly extensive olive groves and sheep, goat, and cattle herds. The village is predominantly Moslem with a Christian minority. There is no electricity and no piped water supply in the village. Cisterns and a spring on a nearby hillside provide the water supply for Tur'an. At the time the project opened there was no surfaced road into the village."

Farm machinery was purchased and brought to Tur'an by the AFSC which was responsible for its operation. Test plots were planted by the Friends with results that favorably impressed the villagers. Cooperation with the Ministry of Agriculture was close from the start, with the Ministry furnishing loans to the people of the village, technical assistance, and seeds, etc. The AFSC carried on a program of education from the beginning of the project and also made every effort to establish an agricultural cooperative that did not materialize because of the loose organization within the village and the lack of effective leaders.

The tangible results of the project were accepted by the villagers who recognized the benefits of farm machinery, proper fertilizing, new crops, greater yields, increased acreage of cultivated land, and a general rise in income level. Evidence of the latter appeared in the additions made to existing dwellings or in the construction of new homes. Only nominal rates were charged for work by machinery and attempts were made to increase the responsibility of the village for the project. However, generally there was "resistance and reluctance on the part of the village to accept responsibility." The Ministry of Agriculture bought the farm machinery and buildings as a unit from the AFSC before belated steps were taken by Tur'an to form a cooperative to purchase the unit. The Ministry agreed to sell the outfit should a cooperative be formed within the village.

Davenport, John. Why Perul pulls dollars. (Fortune, Nov. 1956, vol. 54:5, pp. 130-146, 178, 183-184, 188, with illus., map.)

Spectacular investments in Peru are making a terrific impact on the country, especially on its ports which are being expanded to accommodate deep-draft freighters. Large-scale operations are being forwarded in the vicinity of Ilo where three enormous copper deposits are estimated to contain 12 per cent of the free world's reserves.

U.S. direct investment in Peru had a book value last year of $300 million and a market value of probably $600 million. On a land area of nearly one-sixth of the U.S., Peru supports a population of about 9,500,000, or smaller than that of Greater New York. Peru's gross national product last year ran to about $1.3 billion; and while the country has several rich patrician families, its income per capita in 1955 came to not much over $140, as compared to $762 for Venezuela and $306 for Chile.

Peru has adhered to the version of the policy of the Open Door which has created a climate conducive to growth. And its government has, on the whole, tended to encourage the forces of domestic and foreign capitalism. Although Peru is now developing its industry, over 30 percent of its national product last year came from agriculture, and with its rich families taking the leading role in growing its biggest crop, cotton. The second largest crop is sugar, with one family owning the largest farm, almost as large as the state of Rhode Island. Peruvians have heavily invested in the country's expanding textile industry, smaller mines, cement plants, and operate many of the banks. In 1955 Peru's gross investment (counting all types of expenditures on plant and equipment, housing, and certain public works) ran to over $300 billion. And probably 85 per cent of this outlay came from internal Peruvian sources.

Over the years the largest U.S. commitments in Peru have been in the extractive industries, oil, and more importantly mining. Some oil fields are petering out, causing many oil companies to look beyond the Andes for oil in the jungle. More important to Peru at present is the production of non-ferrous metals. There are five different metal-mining operations. Gerro de Pasco owned by U.S. is top producer and refiner of copper, lead, zinc, and a galaxy of by-products including silver, gold, bismuth, cadmium, and tellurium. "Gerro is not only expanding its facilities, but has also been undergoing a profound change in philosophy. For years the company had a harsh reputation as an employer. Its mining camps, and even Oroya itself, were shabby and unkempt. Today this has greatly changed. Like other big American enterprises, Cerro spends millions each year on free housing, lighting, welfare, and insurance. It spends roughly $1,000 a day on medical services, maintains a $2-million hospital at Oroya and keeps twenty-two doctors on "the Hill" at all times, including the German surgeon, Kurt Helriegel, who working at 12,000-foot altitudes, has recently performed some spectacular operations on the heart -- and on cancer. But if one had to pinpoint Cerro's new social consciousness, it would be its emphasis on training -- training of workers in mine safety, training clerks in the ways of the calculating machine, but above all, training of Peruvian personnel to take over supervisory jobs. Cerro's boast is that out of 20,000 employees, only 400 today are on its dollar payroll, and it would like to reduce this proportion. "We are here to work ourselves out of jobs," says Cerro's Oroya manager. "For any foreign corporation that is the only road to survival."

Summing up the mining developments, the article continues: "Such development, however, cannot be left entirely to large-scale corporations working in the extractive fields of petroleum and metals. For these ventures do not directly strike at Peru's central problem -- the fact that over 80 per cent of its population lives by the land and that currently only about 3 per cent of this land is cultivated. Here certain other undertakings -- some public and some private -- can have a profound effect. The most publicized business venture of the Peruvian Government to date is its opening of a small steel plant at Chimbote, but for many years to come steel will be less important to the economy than just plain water. And to meet this need,

U.S. Engineering talent has been enlisted to overcome the natural Peruvian handicap, namely that its main rivers flow down the eastern slopes of the Andes rather than down their western slopes. In the north, the firm of Morrison-Knudson is building for the government a huge reservoir system that will greatly increase water reserves. In the southern Andes, the Montgomery Construction Co. of Grove City, Pennsylvania, has actually turned the waters of an eastbound river around so that they will flow west. These two engineering feats will bring thousands of acres of coastal land under irrigation.

Le Tourneau's saga. The LeTourneau Technical Institute is a nonprofit organization designed to finance "businesslike Point Four projects." Mr. LeTourneau struck a bargain with Peru to acquire nearly one million acres of jungle land in return for building a 31-mile road near Pucallpa. After spending $1,500,000, work on the road is nearly two-thirds completed and the Le Tourneau encampment on the Pachitea River, once a jungle beach-head, has become a small civilized community.

"To this community, Mr. LeTourneau hopes, will come in time other settlers -- Peruvian, European, and American -- who will buy parcels of land from LeTourneau del Peru; and he likewise hopes for new road-building contracts. The primary objective of his operation, however, is to serve as a starting action, enabling and encouraging Peruvians in the rural and heavily forested regions to lift themselves by their own bootstraps.

"This kind of pioneering is being supplemented by the official Point Four program of the U.S., which last year contributed (mostly by loans from revolving funds) some $2,400,000 to Peru's development in conjunction with another $5 million put up by the Peruvian Government. Directed by the immensely able John R. Neale from Wyoming, who believes that in Peru 'the heart of the health and education problem is food,' this combined Point Four effort has proved that, once the grcund is cleared, cattle raising in the jungle is feasible and may be profitable. On the eastern slopes of the Andes at Tingo Maria, Point Four and Peruvian money run a large experimental station that has helped in the development of coffee, rubber, and tea and encouraged private Peruvian investment.

"For Neale as for other experts, the hard core of the Peruvian development problem lies in the high Sierras, where 60 per cent of the population, overwhelmingly Indian, still lives. In this tremendous region the modern mining town with all its facilities is but a speck on the map. Here, to be sure, there are verdant valleys between the mountains that will grow almost anything -- peaches, pears, apples, wheat and other grains. But here also are areas where the effects of altitude, cold, and malnutrition are all too evident. Peru's most impoverished district is probably the Puno region just north of Lake Titicaca, which last year suffered drought and famine. Food was rushed from the U.S., but such relief is at best a holding action."

Peru's long-range development involves many other, more complex, factors. Basic to these, is the slow spread of education and the establishment of a stable political body. At the moment, the outlook is promising, but the job is tremendous and much depends upon the wisdom of the leaders who must implement the plans of the engineers.

D.

Kingsley Davis and Hilda Hertz, The World Distribution of Urbanization (International Statistical Institute, Bulletin, 1951, vol. xxxiii, Part IV, pp. 227-242, with tables.)

With reference to the earth as a whole, there are three fundamental facts to note about the distribution of urbanization. First, although the modern world is more urbanized than it has been in any previous time, it is still primarily a rural world. Second, the areas manifesting a high degree of urbanization are few in number and highly concentrated. Third, despite the predominantly rural character of the world as a whole and the limited scope of highly urbanized areas, urbanization has (like other traits of modern civilization) spread over the entire globe to some degree. The present chapter gives the evidence for these conclusions and discusses their meaning.

## Still a Rural World

That the world's population is as yet not a city population is shown by our finding, for dates centering around 1950, that the proportion living in cities of 100,000 or more is approximately 13 per cent. Indication that the world's population is not even an urban population is shown by the finding that the proportion in places of 20,000 or more is only 21 per cent; and in places of 5,000 or more, about 30 per cent. (See Table I.) These figures may be inaccurate by varying margins, but they give a good enough indication of the small proportion of the world's population living in urban centers.

Table I

World's urban Places of various Sizes, 1950

| Urban places by size class | Number | Population (millions) | Per cent of world population |
|---|---|---|---|
| 5,000-plus | 27,600 | 717 | 30 |
| 20,000-plus | 5,500 | 502 | 21 |
| 100,000-plus | 875 | 314 | 13 |
| 500,000-plus | 133 | 158 | 7 |
| 1,000,000-plus | 49 | 101 | 4 |

(see also references in UN. ECAFE documents pp 35-38)

Mitchell, J. Murray, Jr. Link warmer climate to city growth. (Heating, piping & air conditioning, Aug. 1956, vol. 28:8, pp. 92-95, with map, table, charts.)

A trend toward warmer climate has been recorded since the turn of the present century in the majority of weather stations all over the world. Corroboration for this trend appears in the continued melting of glaciers, a shrinking ice pack in the Atlantic, a poleward advance of Sub-Arctic flora and fauna, and other evidence. It should be noted that temperature records are generally maintained within urban communities rather than in open country. World population has increased and tended to live and to work in cities and their suburbs.

As the author says: "In the course of time, more and larger buildings have thus come to be built around our thermometer stations; ever increasing numbers of heating plants have been throwing heat into the air around them. Also, thickening palls of smoke and smog -- those unenviable trademarks of many of our larger cities -- have served to hold in more city warmth at night. Increasingly, the great 'deserts' of hot pavement, brick, and stone during the summer have us craving escape to the country or perhaps to the relative comfort of air conditioned areas.

"In short, it is clear that the climate of our cities has become more and more unlike the climate of the surrounding countryside, and, what is especially to the point here, that the gradual physical expansion of our cities over the decades has resulted in a similarly gradual trend toward warmer climate as measured at the Weather Bureau Stations in those cities. This gradual increase in local city warmth, which has had no parallel in the open country, may broadly be referred to as 'city growth influence'."

Local temperatures analyzed extended over a fifty-year period. Allowances were made for the fact that the locations of weather stations were changed in the majority of cities. Nevertheless, the conclusion held that there has been a definite trend toward warmer weather in all cities studied.

In relating the changes in the climate pattern to the demand for fuel and air conditioning, the author mentions two additional factors. The first is the amount of sunlight penetrating and warming a building, and the second is the rate at which warm air leaks out of a building. In regard to the first factor, it can be said that there has been probably an increase in cloudiness over the entire eastern seaboard although comprehensive studies on this type of data have not been completed. As to the second factor, there are also no thorough investigations, but it seems evident that average wind speeds have increased slightly, which, combined with a greater degree of cloudiness, would cause a higher consumption of fuel.

D.

Skeet, T. H. H. India on the move. (The Banker, July 1956, vol. 106:366, pp. 424-429, with table.)

"India," the article begins, "with its population of 360 millions expanding at an annual rate of about 4½ millions, plans to raise its national income by 25 per cent in the period of its second five year plan, 1955-60 . . . The West has a vital interest in India's attempt to raise its productive power and living standards, and is making a substantial contribution to its achievement. In recent months, however, a dramatic challenge to that contribution has been made by Russia and other Communist countries."

While the Communist bloc is making a recent entry into the economic program of India, the West has already contributed substantially in aiding the country to lay the foundations of an industrial program. The International Bank for Reconstruction and Development had advanced millions to India since August 1949 for railway rehabilitation, agricultural development, electric power and flood control and irrigation. The Bank has also enabled the Indian Government to guarantee loans to industry for expansion of iron and steel, for electric power development, and for aid to private industry development.

India's second five year plan aims at a staggering increase in the country's industrial capacity, concentrating mainly in the steel output. In addition to expanding existing plants, the projects approved a new steel plant at Durgapur in West Bengal, one at Rourkela, 250 miles west of Calcutta, and another at Bhilai in Central India. Steel demands at present require imports from Europe and China.

Cement is another short commodity, but demands of the building program will necessitate imports for several years.

Aluminum production is being aided by Aluminum Ltd. of Montreal so that a new factory at Hirakud in Orisso can be constructed.

Technical aid and guidance are being enlisted whenever possible, with the first choice going to Britain, especially for consultants in electric power and chemical fields.

A search for oil was stimulated by a report of a team of Russian experts on mineral resources. Remunerative fields have not yet been discovered that can supply India's requirements, but the hunt continues.

Both the Soviet bloc and the West have offered technical assistance for the development of the coal industry.

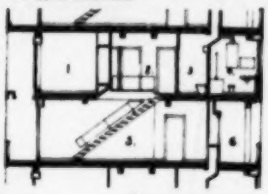
In general, the ultimate aim of the Indian government is social gain rather than private profit, and to this end there has been a reduction of the sphere of private capital in favor of public capital. Principal spheres within the public domain include: arms and ammunition, atomic energy, heavy castings and forgings, heavy plant required for iron and steel production, heavy electrical plant and equipment, copper, zinc, lead, tin, molybdenum, wolfram, and transport. However, debates on state ownership and control are not as yet settled, and it is too early to read clearly present plans and policies.

L'Aero-Habitat, Algiers. (Architectural design, Oct. 1956, vol. 26:10, with illus.)

102
E
Dry

Aerial view of the complex with block B in the foreground

Above: view down stairs towards living room in a typical maisonette



Section of typical maisonette. Key: 1 bedroom 2 stair, hall 3 WC 4 bath 5 living room 6 access gallery

# L'Aéro-Habitat, Algiers

## Bourlier, Ferrer, and Miguel

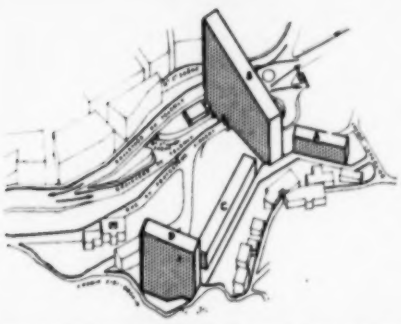


Diagram of buildings on the steep site showing their relation to the road layout

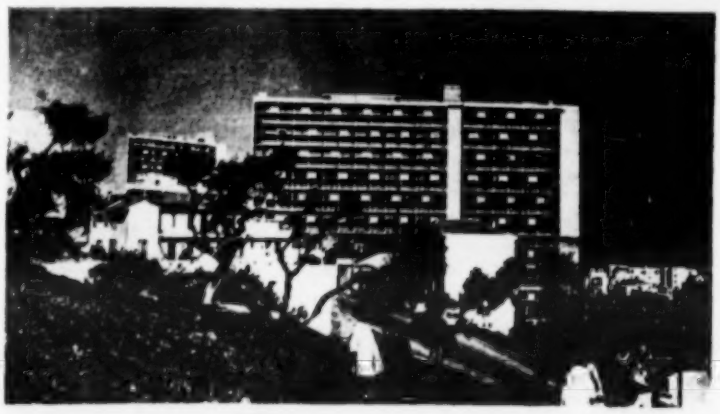
Above and below : two views of the buildings and their setting

The steeply sloping site of this residential development is approximately 3½ acres, and is situated 1½ miles from the centre of Algiers. It commands a magnificent view over the town below, the quays and the bay beyond. It is set in a densely-vegetated area of olive and cypress trees, which act as a perfect foil to the rough concrete of the surrounding structure.

The buildings are of simple reinforced concrete construction, with no special foundations in view of the character of the subsoil.

The two main blocks are built at right angles to the contours. The main one, B, adjacent to Boulevard du Telemly is twelve floors, increasing to twenty-two floors high at the end of the block where the ground has fallen away. From the entrance hall with several shops, close to the public square, there are two lifts to the tenth floor by which access can be gained to the upper floors. The other block, D, is ten floors increasing to sixteen floors high. Blocks A and C are built along the line of the contours. They are four storeys high with two storeys, below ground level, of garages, studios and laundries.

There are 284 flats varying from bed sitting rooms to the typical two-storey three- and four-room flats. A typical flat plan consists of a hall off the access balcony, kitchen, living room with an open staircase to two or three bedrooms and bathroom on the upper floor.



E.

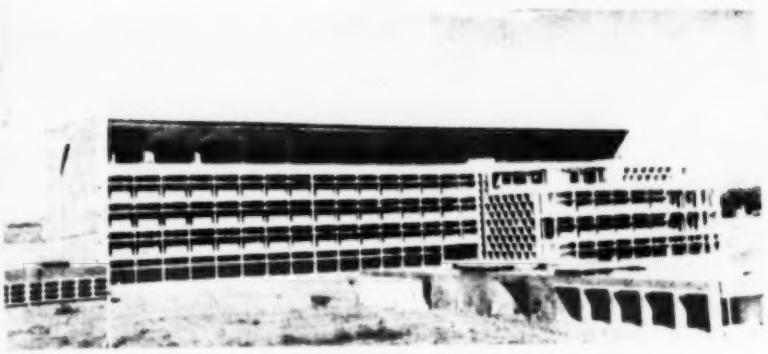
Rechter, Jacob. Israel builds. (Progressive architecture, Nov. 1956, vol. 37:11, pp. 92-93, with illus.) Dry

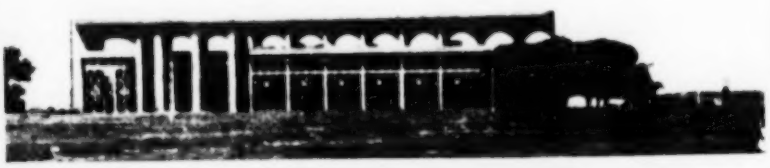
Brief text summarizes the development of contemporary architecture in Israel, not as derived from the Arab mud houses which alone furnished examples from the past, but as a local solution dictated by characteristic ways of life and by certain limitation of building materials. Supplying homes quickly and cheaply has been the first requisite in housing due to the influx of thousands of immigrants within a few years. Economical and sociological problems arose in the search for a fast solution to housing newcomers as well as the aging population. There was, at the same time, a lack of administrative experience in planning and building large-scale housing projects and public buildings, but there has been a move toward accepting large-scale regional planning and better housing for individuals. In addition, hotels, hospitals, theaters, schools and universities have been built to serve the growing demands of the population seeking expression for its ancient culture.
This is a slight article. Illustrations not very valuable.

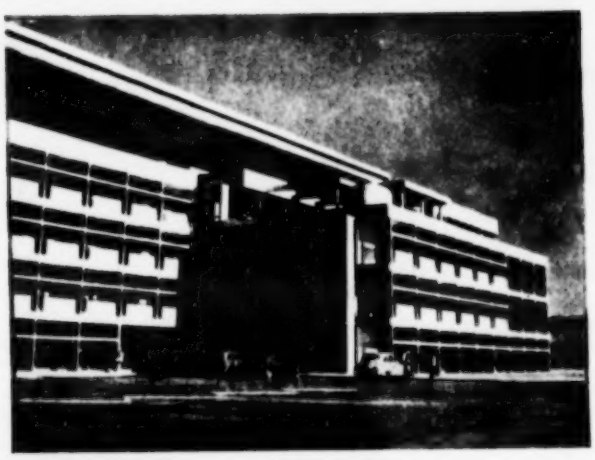
F.

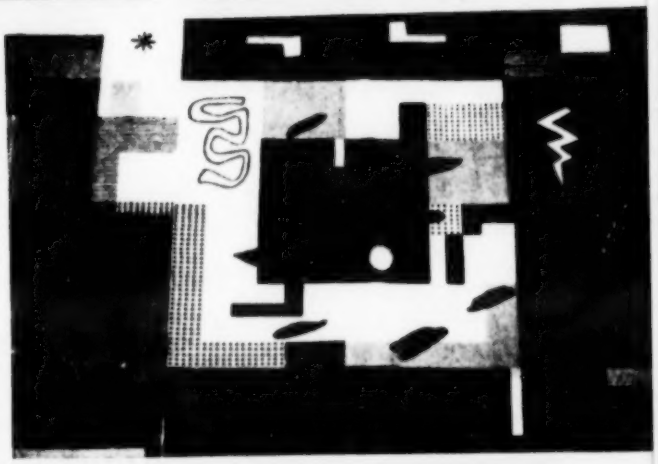
Ancora Chandigarh: architetto Le Corbusier. (L'Architettura: cronache e storia, Aug. 1956, vol. 2:10, pp. 264-265, with illus.) Dry

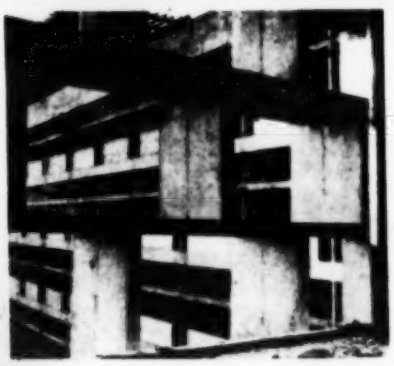
Two pages of photographs show the "first" building of Le Corbusier at Chandigarh. Only the illustrations of the Palace of Justice are reproduced herewith. The two left top views show the south and north façades respectively. The three lower views are a view from the interior of the library, entrance detail of the library, and a cross section.

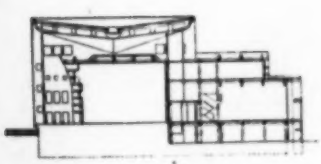












F.

U.S. Foreign Operations Administration. Plant requirements for manufacture of concrete blocks and slabs for walls. Washington, 1955. 18pp., illus., plans, diagrs., cross sections, tables.

As stated in the foreword, reproduced herewith, the purpose of the report, which is one in a series, is to present basic information for establishing and operating a plant to manufacture specific goods in a tropical or semi-tropical climate.

"The purpose of this report is to present basic information for establishing and operating a plant to manufacture concrete blocks and slabs for walls in a country with a tropical or semi-tropical climate. The information includes general manufacturing methods, plant layout, and costs of materials, equipment, and labor based on the assumptions contained in this report.

"The plant described is considered to be the economic minimum in size which utilizes suitable equipment and methods. Products are to be simple and varieties limited in order that costs may be kept to a minimum.

"As an essential preliminary, potential plant operators must determine whether or not there is a market for the products of this plant. Naturally, they must be willing to assume the risks inherent in any business. The profits shown in the profit and loss statement are illustrative and depend upon market conditions, good management and local factors.

"For further information and assistance, readers should contact their local Productivity Center, Industrial Institute, Servicio, or United States Operations Mission.

"This report is one of a series prepared for the Office of Industrial Resources of the INTERNATIONAL COOPERATION ADMINISTRATION by the Methods Engineering Council, Pittsburgh, Pennsylvania."

Plant requirements are available for:

ABRASIVE WHEELS
ANIMAL FEED PELLETS
ASBESTOS - CEMENT SIDING
BRASS FOUNDRY
BUCKETS, PAILS AND PANS
BUILDING BRICKS
BUILDING HARDWARE
CERAMIC DINNERWARE
COARSE WRAPPING PAPER
CONCRETE BLOCKS & SLABS FOR WALLS
COTTON DRESSES
COTTONSEED OIL
FARM HAND TOOLS
FERTILIZER MIXING
FIBRE BOXES
FLAT GLASS
GLASS CONTAINERS
GRAY IRON JOBBING FOUNDRY
JOB MACHINE SHOP
KITCHEN EARTHENWARE
LEATHER TANNING
MEN'S HOSE
MEN'S UNDERWEAR
PAINT
PAINT AND VARNISH BRUSHES
PHOSPHATE PROCESSING
PLASTICS MOULDING
REFINED SUGAR
SANITARY WARE
SHELL BUTTONS
TERRY CLOTH
TWO-BURNER GAS PLATES
WALLBOARD

G.

Isard, Walter, and Robert E. Coughlin. Municipal costs and revenues resulting from community growth. Part I, Residential communities. (Journal of the American Institute of Planners, summer 1956, vol. 22:3, pp. 122-141, with diagr., tables.)

The conclusions, as set forth in accompanying tables, are based on a study of Massachusetts cities and towns. The purpose of the report is to provide information useful to expanding communities so that they will have a guide in making decisions concerning their physical development and in planning a financially efficient structure consistent with the social values of their residents. The figures are for a hypothetical community built from the ground up, situated within a metropolitan region and primarily residential. The authors envisage "an existing settled area which has a population of somewhat over 25,000 persons and a vacant area on its edge which will be completely developed as a new community within 20 years. This area is settled at the rate of 620 dwelling units every five years, and in 20 years consists of 2480 dwelling units (housing about 8700 people) in addition to a typical set of local commercial, educational, and other community facilities. These latter are located centrally so that the number of trip-miles involved in their use will approach a minimum. We assume rational planning from the start. Construction of facilities in excess of service requirements is avoided, unless such construction is economic in the long run.

"Requirements for community facilities are developed for three densities of residential settlement: 1 dwelling unit, 4 dwelling units, and 16 dwelling units per acre. The first of these densities is typical of acre-lot developments in medium-sized towns and the last, of row-house developments."

Costs and revenues need to be appropriately modified to reflect prices, labor costs, construction and materials costs, tax policies, and other factors. The authors point out at the beginning of the article that communities differ, no two are exactly alike, and for that reason they have studied the individual activities and functions which generate costs and revenues. The tables apply to a town typical of a "high-income low-revenue rate" where an industry has entered which employs workers who are in the low-income bracket. The text continues: "Unless these industries bring to the town considerable taxable base, or unless they draw most of their low-income workers from other towns, the typical revenue rate of high-income communities applied to the valuations of the residences of the low-income workers and of industrial property will yield insufficient revenue to meet additional costs. An over-all raising of rates will be required."

The article is part of a major report to be published in its entirety by the American Institute of Planners. The research leading to the report was conducted by the Urban and Regional Studies Section of the Department of City and Regional Planning, Massachusetts Institute of Technology, and was supported by a grant from the Federal Reserve Bank of Boston.

## TABLE 1

**Requirements for Major Community Facilities: Medium Level of Service (By Five-Year Periods and Cumulated)**

| Item | Years | LOW-DENSITY COMMUNITY | | MEDIUM-DENSITY COMMUNITY | | HIGH-DENSITY COMMUNITY | |
|---|---|---|---|---|---|---|---|
| | | Requirements by 5 yr. periods | Cumulated Requirements | Requirements by 5 yr. periods | Cumulated Requirements | Requirements by 5 yr. periods | Cumulated Requirements |
| Main Road | 1– 5 | 0.902 | 0.902 | 0.557 | 0.557 | 0.308 | 0.308 |
| (miles | 6–10 | 0.0 | 0.902 | 0.0 | 0.557 | 0.0 | 0.308 |
| 44 feet | 11–15 | 0.697 | 1.599 | 0.540 | 1.097 | 0.280 | 0.588 |
| wide) | 16–20 | 0.0 | 1.599 | 0.0 | 1.097 | 0.0 | 0.588 |
| Feeder Road[1] | 1– 5 | 2.115 | 2.115 | 1.19 | 1.19 | 0.836 | 0.836 |
| (miles) | 6–10 | 1.695 | 3.810 | 1.12 | 2.31 | 0.844 | 1.68 |
| | 11–15 | 2.120 | 5.930 | 1.12 | 3.43 | 0.750 | 2.43 |
| | 16–20 | 2.050 | 7.980* | 1.06 | 4.49* | 0.720 | 3.15* |
| Local Road[2] | 1– 5 | 7.35 | 7.35 | 4.50 | 4.50 | 1.69 | 1.69 |
| (miles) | 6–10 | 7.50 | 14.85 | 4.50 | 9.00 | 1.69 | 3.38 |
| | 11–15 | 7.35 | 22.20 | 4.42 | 13.42 | 1.47 | 4.85 |
| | 16–20 | 7.20 | 29.40* | 4.42 | 17.84* | 1.47 | 6.32* |
| Sidewalks[3] & Curbs | 1– 5 | 9.465 | 9.465 | 11.38 | 11.38 | 5.668 | 5.668 |
| (miles) | 6–10 | 9.195 | 18.660 | 11.24 | 22.62 | 5.068 | 10.736 |
| | 11–15 | 9.470 | 28.130 | 11.08 | 33.70 | 5.000 | 15.736 |
| | 16–20 | 9.250 | 37.380 | 10.96 | 44.66 | 4.380 | 20.116 |
| Sewerage Plant | 1– 5 | 0.0033 | 0.0033** | 0.1795 | 0.1795 | 0.1795 | 0.1795 |
| (million | 6–10 | 0.0033 | 0.0066 | 0.1630 | 0.3425 | 0.1630 | 0.3425 |
| gallons per | 11–15 | 0.0033 | 0.0099 | 0.1795 | 0.5220 | 0.1795 | 0.5220 |
| day) | 16–20 | 0.0033 | 0.0132 | 0.1630 | 0.6850 | 0.1630 | 0.6850 |
| Sanitary Sewers[4] | 1– 5 | 0.0 | 0.0 | 5.66 | 5.66 | 2.31 | 2.31 |
| (equivalent | 6–10 | 0.0 | 0.0 | 4.64 | 10.30 | 1.94 | 4.25 |
| miles of | 11–15 | 0.0 | 0.0 | 3.97 | 14.29 | 1.33 | 5.58 |
| 10″ pipe) | 16–20 | 0.0 | 0.0 | 3.97 | 17.26 | 1.33 | 6.91 |
| Storm Sewers[5] | 1– 5 | 0.0 | 0.0 | 3.60 | 3.60 | 1.41 | 1.41 |
| (equivalent | 6–10 | 0.0 | 0.0 | 2.17 | 5.77 | 0.72 | 2.13 |
| miles of | 11–15 | 0.0 | 0.0 | 1.17 | 6.94 | 0.42 | 2.55 |
| 42″ pipe) | 16–20 | 0.0 | 0.0 | 1.17 | 8.11 | 0.42 | 2.97 |

## TABLE 3

**Annual Costs of Major Capital Outlays and Annual Maintenance and Operating Costs, At End of Five-Year Periods: Medium Level of Service**

| Item | Year | LOW-DENSITY COMMUNITY | | MEDIUM-DENSITY COMMUNITY | | HIGH-DENSITY COMMUNITY | |
|---|---|---|---|---|---|---|---|
| | | Annual Costs of Capital Outlays | Maintenance and Operating Costs | Annual Costs of Capital Outlays | Maintenance and Operating Costs | Annual Costs of Capital Outlays | Maintenance and Operating Costs |
| Main Road | 5 | $ 12,870 | $ 1,070 | $ 8,170 | $ 660 | $ 4,650 | $ 370 |
| | 10 | 12,870 | 1,070 | 8,170 | 660 | 4,650 | 370 |
| | 15 | 25,740 | 1,940 | 7,900 | 1,310 | 8,860 | 700 |
| | 20 | 25,740 | 1,940 | 7,900 | 1,310 | 8,860 | 700 |
| Feeder Roads | 5 | 12,900 | 1,100 | 9,750 | 820 | 8,770 | 730 |
| | 10 | 25,400 | 2,160 | 19,380 | 1,610 | 17,050 | 1,420 |
| | 15 | 25,400 | 3,260 | 18,610 | 2,380 | 16,230 | 2,080 |
| | 20 | 34,750 | 4,320 | 25,080 | 3,120 | 21,730 | 2,700 |
| Local Roads | 5 | 38,600 | 3,190 | 33,000 | 2,730 | 16,500 | 1,330 |
| | 10 | 77,200 | 6,380 | 66,000 | 5,460 | 33,000 | 2,660 |
| | 15 | 77,200 | 9,570 | 66,000 | 8,140 | 30,900 | 3,810 |
| | 20 | 93,300 | 12,760 | 80,200 | 10,820 | 32,600 | 4,960 |
| Sidewalks and Curbs | 5 | 11,050 | ... | 26,000 | ... | 15,200 | ... |
| | 10 | 21,800 | ... | 51,600 | ... | 28,800 | ... |
| | 15 | 32,800 | ... | 76,800 | ... | 42,200 | ... |
| | 20 | 43,500 | ... | 101,700 | ... | 53,900 | ... |
| Sewerage Plants | 5 | 690 | ... | 2,800 | 1,640 | 2,800 | 1,640 |
| | 10 | 1,380 | ... | 5,340 | 3,120 | 5,340 | 3,120 |
| | 15 | 2,070 | ... | 7,080 | 4,760 | 7,080 | 4,760 |
| | 20 | 2,760 | ... | 10,700 | 6,250 | 10,700 | 6,250 |
| Sanitary Sewers | 5 | 0 | ... | 7,350 | ... | 3,020 | ... |
| | 10 | 0 | ... | 16,380 | ... | 5,530 | ... |
| | 15 | 0 | ... | 20,980 | ... | 7,280 | ... |
| | 20 | 0 | ... | 25,580 | ... | 9,020 | ... |
| Storm Sewers | 5 | 0 | ... | 14,100 | ... | 5,560 | ... |
| | 10 | 0 | ... | 22,630 | ... | 8,430 | ... |
| | 15 | 0 | ... | 29,100 | ... | 10,000 | ... |
| | 20 | 0 | ... | 35,570 | ... | 11,700 | ... |
| Elementary Schools (Constr.) | 5 | 19,300 | 52,700 | 19,300 | 52,700 | 19,300 | 52,700 |
| | 10 | 38,600 | 102,800 | 38,600 | 102,800 | 38,600 | 102,800 |
| | 15 | 57,900 | 155,500 | 57,900 | 155,500 | 57,900 | 154,400 |
| | 20 | 77,200 | 205,600 | 77,200 | 205,600 | 77,200 | 205,600 |
| Elementary Schools (Equip.) | 5 | 2,540 | ... | 2,540 | ... | 2,540 | ... |
| | 10 | 5,080 | ... | 5,080 | ... | 5,080 | ... |
| | 15 | 5,080 | ... | 5,080 | ... | 5,080 | ... |
| | 20 | 5,080 | ... | 5,080 | ... | 5,080 | ... |
| Secondary Schools (Constr.) | 5 | 26,400 | 71,200 | 26,400 | 71,200 | 26,400 | 71,200 |
| | 10 | 53,800 | 125,800 | 53,800 | 125,800 | 53,800 | 125,800 |
| | 15 | 80,200 | 181,300 | 80,200 | 181,300 | 80,200 | 181,300 |
| | 20 | 107,600 | 242,300 | 107,600 | 242,300 | 107,600 | 242,300 |

TABLE 3 (continued)

| Item | Year | LOW-DENSITY COMMUNITY | | MEDIUM-DENSITY COMMUNITY | | HIGH-DENSITY COMMUNITY | |
|---|---|---|---|---|---|---|---|
| | | Annual Costs of Capital Outlays | Maintenance and Operating Costs | Annual Costs of Capital Outlays | Maintenance and Operating Costs | Annual Costs of Capital Outlays | Maintenance and Operating Costs |
| Secondary Schools (Equip.) | 5 | $ 4,630 | $ ... | $ 4,630 | $ ... | $ 4,630 | $ ... |
| | 10 | 9,260 | ... | 9,260 | ... | 9,260 | ... |
| | 15 | 9,260 | ... | 9,260 | ... | 9,260 | ... |
| | 20 | 9,260 | ... | 9,260 | ... | 9,260 | ... |
| Land | 5 | 3,080 | ... | 3,050 | ... | 2,990 | ... |
| | 10 | 3,310 | ... | 3,450 | ... | 3,500 | ... |
| | 15 | 3,820 | ... | 3,960 | ... | 4,010 | ... |
| | 20 | 3,820 | ... | 3,960 | ... | 4,010 | ... |
| TOTAL | 5 | 132,060 | 129,260 | 157,090 | 129,750 | 172,360 | 127,970 |
| | 10 | 248,700 | 238,480 | 299,690 | 239,450 | 213,040 | 236,170 |
| | 15 | 319,470 | 351,570 | 382,870 | 353,390 | 279,000 | 347,050 |
| | 20 | 403,010 | 466,920 | 489,830 | 469,400 | 351,660 | 462,510 |

TABLE 4

Annual Costs of Major Capital Outlays on a Real Basis Cumulated by Five-Year Periods: Medium Level of Service

| Item | Year | LOW-DENSITY COMMUNITY | MEDIUM-DENSITY COMMUNITY | HIGH-DENSITY COMMUNITY |
|---|---|---|---|---|
| Main Road | 5 | $ 5,200 | $ 3,340 | $ 1,890 |
| | 10 | 5,200 | 3,340 | 1,890 |
| | 15 | 9,490 | 6,580 | 3,780 |
| | 20 | 9,490 | 6,580 | 3,780 |
| Feeder Road | 5 | 6,100 | 4,660 | 4,160 |
| | 10 | 11,030 | 9,100 | 8,080 |
| | 15 | 17,130 | 13,480 | 11,850 |
| | 20 | 23,060 | 17,660 | 15,420 |
| Local Road | 5 | 15,800 | 13,800 | 7,220 |
| | 10 | 31,600 | 27,600 | 14,440 |
| | 15 | 47,400 | 41,200 | 20,840 |
| | 20 | 63,200 | 54,800 | 27,240 |
| Sidewalks and Curbs | 5 | 3,680 | 8,700 | 5,060 |
| | 10 | 7,270 | 17,200 | 9,600 |
| | 15 | 11,000 | 25,600 | 14,100 |
| | 20 | 14,500 | 34,000 | 18,000 |
| Sewerage Plant | 5 | 390 | 1,570 | 1,570 |
| | 10 | 580 | 2,990 | 2,990 |
| | 15 | 970 | 4,560 | 4,560 |
| | 20 | 1,360 | 5,980 | 5,980 |
| Sanitary Sewers | 5 | 0 | 4,850 | 1,450 |
| | 10 | 0 | 8,850 | 3,640 |
| | 15 | 0 | 12,200 | 3,720 |
| | 20 | 0 | 15,600 | 3,840 |
| Storm Sewers | 5 | 0 | 9,300 | 3,650 |
| | 10 | 0 | 14,900 | 5,500 |
| | 15 | 0 | 17,950 | 6,580 |
| | 20 | 0 | 20,950 | 7,670 |
| Elementary Schools (Constr.) | 5 | 10,840 | 10,840 | 10,840 |
| | 10 | 21,700 | 21,700 | 21,700 |
| | 15 | 32,520 | 32,520 | 32,520 |
| | 20 | 43,360 | 43,360 | 43,360 |

**TABLE 5**

**Combined Annual Capital and Operating Costs for Other Municipal Services at End of Five-Year Periods By Community Income Level: Medium Level of Service**

| Item | Year | LOW-INCOME COMMUNITY | MEDIUM-INCOME COMMUNITY | HIGH-INCOME COMMUNITY |
|---|---|---|---|---|
| Rubbish & Garbage Collection | 5 | $ 3,470 | $ 3,470 | $ 3,470 |
| | 10 | 6,940 | 6,940 | 6,940 |
| | 15 | 10,410 | 10,410 | 10,410 |
| | 20 | 13,900 | 13,900 | 13,900 |
| Other Sanitary Service | 5 | 4,020 | 4,020 | 4,020 |
| | 10 | 8,040 | 8,040 | 8,040 |
| | 15 | 12,060 | 12,060 | 12,060 |
| | 20 | 16,080 | 16,080 | 16,080 |
| Fire Protection | 5 | 7,420 | 7,450 | 7,640 |
| | 10 | 14,480 | 14,900 | 15,280 |
| | 15 | 22,260 | 22,350 | 22,920 |
| | 20 | 29,680 | 29,800 | 30,560 |
| Police Protection | 5 | 7,230 | 7,350 | 7,930 |
| | 10 | 14,450 | 14,690 | 15,860 |
| | 15 | 21,680 | 22,040 | 23,790 |
| | 20 | 28,900 | 29,380 | 31,720 |
| Public Welfare | 5 | 80,500 | 52,000 | 49,900 |
| | 10 | 161,000 | 104,000 | 99,800 |
| | 15 | 241,500 | 156,000 | 149,700 |
| | 20 | 322,000 | 208,000 | 199,600 |
| Miscellaneous Municipal Services | 5 | 52,000 | 52,000 | 52,000 |
| | 10 | 104,000 | 104,000 | 104,000 |
| | 15 | 156,000 | 156,000 | 156,000 |
| | 20 | 208,000 | 208,000 | 208,000 |
| TOTAL | 5 | 154,640 | 126,290 | 124,960 |
| | 10 | 309,270 | 252,570 | 249,920 |
| | 15 | 463,910 | 378,860 | 374,880 |
| | 20 | 618,540 | 505,140 | 499,840 |

G.

Humid

Urrutia, Rafael B. San Juan's newest water supply. New program includes construction of a dam, hydroelectric plant, filter plant, and extensive sanitation program for the protection of the watershed area. (American city, Nov. 1956, vol. 71:11, pp. 101-103, with illus.) (Puerto Rico)

The introductory paragraphs adequately summarize the account:

"From its discovery by Columbus in 1493 until recently, Puerto Rico has had an agricultural economy and a predominantly rural population. Of late there has been a rapid growth of urban population in Puerto Rico, while the rural population remains almost at a standstill. In particular, the San Juan Metropolitan Zone, which is composed of the ancient capital and 14 surrounding towns, has grown in population and in industry. Approximately 500,000 residents and several hundred industries make up this zone.

"As a result of this urban growth and diversified economy, the provision of adequate public water supplies has been a major engineering problem during the past decade. The Puerto Rico Aqueduct and Sewer Authority, a governmental corporation, owns and operates all the public water supplies and sewerage systems in the island. The Authority, created in 1945, faced a major problem in the San Juan area. The existing Guaynabo supply -- an impounded gravity filtered supply -- proved inadequate during the drought years of 1947 and 1948.

"Sanitation a Necessity. After engineering studies, it was decided to develop a new supply from the Rio Grande de Loiza -- largest river in Puerto Rico -- which flowed through the outskirts of the metropolitan zone. This integrated development comprised sanitation in the 207-square-mile-watershed; construction of a dam at Trujillo Alto; creation of 6 ½ billion gallon raw water reservoir; construction of a hydroelectric generating station and water pumping station adjacent to the dam; installation of approximately 3.4 miles of 48-inch Lock Joint concrete pipe between the dam and a new filter plant; and construction of a 30 million gallon daily modern rapid sand filter plant.

"The watershed included five towns with a total urban population of about 60,000 and two large sugar mills that discharged sanitary and industrial wastes into the river. The Authority improved the sewage-treatment plants of four towns and constructed a new complete treatment plant for the fifth town. It also sponsored a cooperative investigation for the purification of the industrial wastes from the sugar mills. In cooperation with the Department of Health, a program of latrine inspection among the 90,000 rural inhabitants was undertaken."

The final paragraph explains how the project was financed: "Money was obtained from a $22,700,000 revenue bond issue underwritten in 1949 by a syndicate headed by the First Boston Corporation and B. J. Van Ingen Company. The Chase Manhattan Bank is trustee for the issue. The entire project is self-liquidating over a period of 30 years."

K.

Atlantic monthly. Perspective of the Arab world. (Atlantic monthly, Oct. 1956, vol. 198:4, supplement, with illus.) Dry

Includes photographs, with brief text, of Gourna Village, "one of the most interesting projects among the development plans of the Arab states in Egypt's resettlement. Some 7,000 impoverished villagers are being moved from hovels on an arid hillside near the ancient necropolis of Thebes at Luxor to a new site where adjacent land can be irrigated for cultivation. The new village of Gourna is being planned in detail by the architect Hassan Fathi, who has based his designs on the needs of the community's traditional social structure and on the idea that the villages must build for themselves, learning improved ways to use the local materials -- chiefly sun-dried bricks made from mud and straw -- which, with an average annual income of less than $100 per family, they can afford."

A reprint of the supplement has been mailed to Dr. Doxiadis.

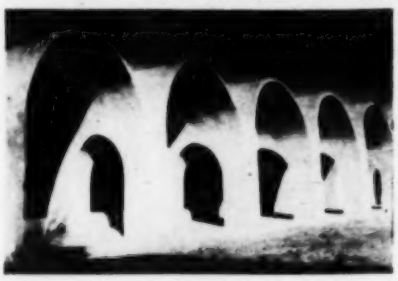
# GOURNA VILLAGE

*Vaulted house roofs in the new Gourna*

**Both from an architectural and a sociological point of view, one of the most interesting projects among the development plans of the Arab states is Egypt's resettlement of the village of Gourna. Some 7,000 impoverished villagers are being moved from hovels on an arid hillside near the ancient necropolis of Thebes at Luxor to a new site where adjacent land can be irrigated for cultivation. The new village of Gourna is being planned in detail by the architect Hassan Fathi, who has based his designs on the needs of the community's traditional social structure and on the idea that the villagers must build for themselves, learning improved ways to use the local materials — chiefly sun-dried bricks made from mud and straw — which, with an average annual income of less than $100 per family, they can afford.**

*A typical group of houses in the old Gourna where poor sanitation made malaria epidemics a scourge*

*At first reluctant to move, the villagers are now both healthier and happier in the new Gourna, where public buildings encourage communal activities which enrich their lives*



*In the new market, vaulted stalls connected by lateral arcades provide shade for sellers, their wares, and their clients*

1

2

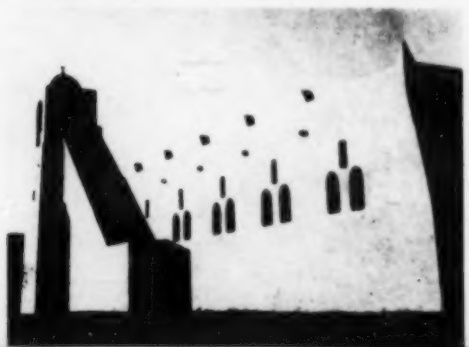
3

4

1: *A street in the new Gourna*
2: *Girls' school. There is also a boys' school and one for crafts*
3: *A household baking oven*
4: *A household laundry basin*

**For the new village of Gourna, Hassan Fathi has preserved traditional motifs for decoration and revived some ancient yet still functional structural techniques, such as brick barrel-vault roofs which require no expensive lumber, and, for community buildings, a simple but effective air conditioning system which sucks a draft through a vertical shaft over beds of moistened charcoal. Separate stables for farm animals, covered manure pits, a clean water supply from neighborhood pumps, and proper drainage of waste will improve sanitation. Monotony has been avoided by varying the pattern of adjacent family-group dwellings and using frequent offsets in an irregular street plan. Some of the Gourna youths trained as masons are already in demand to help reconstruct other nearby villages.**

*The new theater (left) where folk festivals and plays are staged, and Shura shura, and the town hall (right) which houses the post office, mayor's office, and community services*



Giordani, Pierluigi. Paesi di bonifica. Vocazione degli abitanti del Delta. (L'Architettura, Aug. 1956, vol. 2:10, pp. 284-290, with illus.)

The English summary of the text is quoted:

"Workers in the large farms near the Po Delta live in communities without any 'structure' whatsoever, which reflect their provisional economic status. These centers may be classified in four main groups: (1) the road-village in which houses are built along a main highway, so that the growth of social life is prevented; (2) the country-village composed of huts made with canes, scattered over the muddy dunes; (3) the farm-village reflecting a medieval type of economy which keeps men tied to their place of work; (4) the 'alien' village, characterized by a ridiculous monumental type of architecture, which demonstrates the lack of understanding of the rich towards the underprivileged. No true communities can possibly exist under such economic conditions. This is why planning in these areas never acquires a physiognomy of its own. These villages are outcasts."

U.S. Bureau of Foreign Commerce. Investment in Japan: basic information for United States businessmen. Washington, Govt. Printing Office, 1956. 150 pp., map, tables.

The foreword states: "This handbook, designed primarily to serve the needs of potential investors, is one in a series of country studies issued by the U.S. Department of Commerce. The basic economic, commercial, and legal information brought together here will also be of interest to exporters and importers trading with Japan." Partial or full texts of laws or treaties or regulations are included if pertinent to private investment and trade. The World Trade Information Service and the Foreign Commerce Weekly supply current data to keep the handbooks up to date.

The following countries have published manuals in the same series:

| | |
|---|---|
| Venezuela | Philippines |
| India | Mexico |
| Colombia | Japan |
| Paraguay | Federation of Rhodesia and Nyasaland |
| Pakistan | Indonesia |
| Union of South Africa | |

Four are now in press: Central America, Turkey, Australia and Cuba.

A related study has been published in two parts: Factors limiting U.S. investment abroad.

Chapters in the investment handbooks are divided into eleven headings:

1 The climate for foreign investment
- Extent and kinds of investment
- Social and political factors
- Economic considerations
- Government and business policies

2 Geography, people, government
- The physical environment
- The population
- The government
- International relations

3 Resources and industry
- Agriculture
- Fisheries
- Forestry
- Other basic resources

4 Transportation and communications
- Shipping
- Railways
- Highways
- Air transportation
- Communications facilities.

5 Financial organization and policy
- Historical background
- Monetary policy
- Foreign exchange business
- Domestic financing
- Capital facilities
- Credit and interest
- Public finance

6 Foreign trade and commercial policy
- Receipts and payments
- Nature and direction of trade
- Problems in increasing exports
- Commercial policy

7 Trade and exchange controls
Trade controls
Exchange controls

8 Business policy and foreign investment
Licensing and registration
The foreign investment law
Treaties and agreements

9 Taxation
Corporation taxes
Noncorporate business taxes
Personal income taxation
Japan-U.S. Tax Convention

10 Business organization and management
The nature of business
Laws relating to business

11 Labor and social security
Labor force and labor supply
Wages and labor cost
Labor unions
Industrial disputes
Labor legislation

Appendixes

78.

T.

Graus, H. U.S. Army develops heating and air conditioning units. (Air conditioning, heating and ventilating, Oct. 1956, vol. 53:10; with illus.)

The article describes various units developed by the Army as a result of studies. The units are specially designed for heating and air conditioning prefabricated buildings for use in various temperature zones, and for vans carrying special equipment. The following paragraphs are quoted from the text:

"On the cooling side of comfort control, a family of air conditioners ranging from 9,000 Btu per hr for small shelters to 75,000 Btu per hr has been developed.

"The smallest is similar to a commercial window unit except that it is smaller and lighter and capable of operating continuously at 125 deg. It has been used in the mobile soil testing laboratory and in a Signal Corps mobile communications shelter. Effects are being made to lower its power requirements. Standardization is expected in the near future.

"The next size in the family, the 18,000 Btu per hr air conditioner, is the so-called 'building block' unit. Now standard, it features five sections, each rotatable in any one of 90 deg positions to permit a maximum number of different configurations. Its mountings may be all inside, all outside or split type. Present development includes an identical unit for 400-cycle power for guided missile system, radar and fire control trailers.

"Originally, developed for spot cooling of planes, the next unit, 26,500 Btu per hr is trailer mounted and gasoline engine driven. It is now used on weapons systems in which the air is ducted in and out of the control trailers by 12-inch collapsible insulated flexible ducts. Incorporating humidity as well as temperature control, the standard unit can be used in any application when power is not available.

"It may be replaced by either a 48,000 Btu per hr unit now under test or a 60,000 Btu per hr unit to be tested shortly. Also, trailer mounted by 400 cycle motor driven, this type air conditioner is equipped with ducts for air supply and return, and employs automatic temperature and humidity control."

Water Cooled Air Conditioner. The only such conditioner in the Army system is a 60,000 Btu per hr size, designed primarily for hospital use in relatively permanent establishments where water supply is plentiful. It is electric motor driven and furnished with a cooling tower so that the water can be recycled with only a small amount of makeup necessary to take care of loss from evaporation.

"In the air conditioning field an exhaustive study is being conducted on coils. Twelve units utilizing six different combinations of aluminum coils are undergoing extended tests at the Laboratories Panama Test Station. Two thousand-hour salt spray tests have been completed on five coils of different materials but of identical size and shape.

"Mention should be made of future development possibilities in the heating and air conditioning field. These include a gas turbine heater, an atomic powered combination heater and air conditioner, air cycle air conditioning, and a small centrifugal compressor. All point toward smaller and lighter items."

McClure, F. A. Bamboo as a building material. Washington, U.S. Dept. of Agriculture, Foreign Agricultural Service, 1953. 52pp., illus., diagrs. Spanish translation published by Centro Intercam Interamericano de Vivienda, Bogota, 1956.

"Bamboo is one of the oldest materials used by mankind to increase comfort and well-being." With this sentence the introduction goes on to explain that the Point Four program of technical cooperation has singled out bamboo as a species of plant with outstanding utility and unique quality. In six Latin American countries, projects are carried on to test and select outstanding varieties of bamboo gathered from over the world in order to determine their potential place in local economies. These projects are not only investigating the usefulness of bamboo in construction, but are seeking to apply large-scale, mechanized methods to the production of papers and rayon from bamboo as new industries for underdeveloped countries.

The parts of a house for which bamboos are suitable are: foundation, frame, floors, walls, partitions, ceilings, door and windows, roof, pipes and troughs. In fact, they may be used alone to make all parts of a house except the fireplace and the chimney. Generally bamboo is combined with other building materials such as wood, clay, lime, cement, galvanized iron, and palm leaves, according to their relative suitability, availability, and cost. Structural soundness adequate to meet local conditions is commonly achieved with bamboo, but bamboo houses are generally mediocre in execution and monotonous in design. Exceptions to the latter appear at higher economic levels in Japan, Java, and Malaysia where bamboo is employed architecturally in ways that are distinctive and artistic. (Burma !! ed.)

Characteristics of bamboo that make it suitable and economical as a building material in house construction and also in scaffolding are: resiliency, uniformity of size, lightness in weight, naturally attractive color.

Foundation. Bamboo posts are used for foundation posts in both hemispheres. Unless they are treated with effective fungicidal preservative such posts do not last more than two or three years on the average, or five years under favorable conditions. In the absence of experiments it seems reasonable to expect that the lasting qualities of bamboo culms could be extended by applying pentachlorophenol in an appropriate form. Otherwise, it is better to use another, more durable material such as concrete or stone, or brick or hard wood. If used as supporting posts in low cost houses, culms should have a large diameter, thick walls, and nodes close together to give maximum resistance to bending. Smaller bamboos can be bound together to make composite pillars.

Frame. The basic frame of a house is often made partly or wholly of materials other than bamboo because hard woods make stiffer joints and more rigid construction and have greater resistance to rot fungi and wood-eating insects. Certain circumstances make the superior resiliency of a bamboo frame preferable to rigid construction. Earthquakes. Where earthquakes occur frequently, a bamboo-framed house may survive and remain serviceable longer than any other type.

In selecting bamboo for structural elements, only whole culms should be used for the principal parts of the frame. To get relatively uniform diameters, and maximum thickness of wood wall (for stiffness and strength), the upper, highly tapered, relatively thin-walled portion of the culms is removed. These tip cuts may be used in wattle-and-daub partitions, or for roof sheathing, where close spacing may make up for the inferior properties of individual units.

The use of bamboo imposes certain limitations in construction. Mortice and tenon joints cannot be used in framing bamboo; any cut, such as a notch or mortice, reduces the strength of a bamboo. The only exception is the notch used at the upper end of posts to cradle more securely the horizontal elements that rest upon them. Many structural elements however, can be supplied by bamboo, such as corner posts, girders or plates, joints, studs, struts or braces, tie beams, king posts, purlins, ridgepoles, rafters, sheathing, and others.

The culms of most bamboos will not take nails without splitting. This is overcome by the use of lashings which, in the Far East, are commonly made of withes from split bamboo, or from rattan. Where bamboos yield brittle withes, tough vines or the bark of certain trees and shrubs may be used. In some areas soft

iron wire, most of it galvanized, is used.

Floors. Many bamboo houses have no floor other than the surface of the earth on which they are built. This surface should be, and usually is, raised somewhat by filling with earth, to prevent inundation by drainage water; it may be compacted by pounding. If the fill is made with clay, so much the better, for clay affords a relatively stable surface. The surface of a dirt floor may be made more stable by paving it with bamboo boards. The soil should first be graded to provide natural drainage, but not compacted, before the bamboo boards are laid in place. These may then be pounded with a tamper of suitable design, to drive them into close contact with the surface of the soil, which is compacted by the same operation.

In better houses, the floor is raised above the ground. This arrangement is more hygienic, and provides a sheltered space below the floor, which has many potential uses. In some areas this space is devoted to the rearing of various domestic animals; elsewhere it may be used for the storage of tools and farm equipment, or even farm produce. It may provide a welcome sheltered play space for children in inclement weather.

Serviceable and attractive raised floors may be made entirely of bamboo, given suitable species and a sound structural design. The principal features in conventional design are the supporting beams (part of the basic frame) and the floor covering.

Bamboo culms are more resilient than conventional timbers, and the space between supports should be reduced accordingly. Spacing specifications must be worked out locally for the individual species of bamboo and the size of culm used.

The floor covering may be made of small whole culms, strips, or bamboo boards made by opening and flattening out whole culms. When the floor consists of bamboo boards, it is generally fastened down by the use of thin strips of bamboo secured to the supporting members by thongs, wire lashings, or small nails, according to local preference and the materials available.

Walls, Partitions, Ceilings. The construction of bamboo walls is subject to infinite variation, depending on the strength required (for resistance to natural forces such as hurricanes and earthquakes), the protection desired from rain and ordinary winds, and the need for light and ventilation. Either whole culms or longitudinal halves may be used, and they may be applied in either horizontal or vertical array. They function more effectively, however, when they are vertical, and are more durable; for they dry more quickly after rain.

A form of wall construction widely favored in Latin America is called bajareque -- at least in Ecuador. It is made by nailing or lashing bamboo strips or slender culms, horizontally and at close intervals, to both sides of hardwood or, more rarely, bamboo posts. The space between the strips is filled with mud alone or with mud and stones. During this operation, the bamboo strips are more or less completely covered with mud but in time they become exposed by weathering. This form of construction is relatively massive, though less so than walls made of conventional stone, rammed earth, or adobe bricks.

Another form of wall construction, perhaps more widely used, is known in Peru and Chile as quincha. It is a sprung-strip construction, known as lath-and-plaster, wattle-and-daub, or stud-and-mud. In this form, the flexible strips are woven together to provide a base to receive the plaster, which is applied to one side only or to both sides.

A more attractive but less substantial covering may be made of bamboo boards. If these boards are expanded slightly, i.e., stretched laterally, as they are attached, they provide a suitable base for plaster or stucco. Sometimes barbed wire is nailed to the surface to provide a better bond for the stucco. When whitened with lime or painted with cement, this exterior is very attractive.

Partitions are commonly of the lightest construction, such as a thin matting supported by a light framework of bamboo poles. In the Philippine Islands, and generally in the Far East, where suitable bamboos are plentiful, the partitions and even the outer walls of houses are commonly covered with matting woven from thin strips split from the culms. For this purpose, bamboos with thin-walled

culms and tough wood, such as many species of the genus Schizostachyum afford, are preferred.

The width of the splines, or thin bamboo strips, and the pattern of weave vary locally and according to the desired quality of matting (called sawale in the Philippine Islands). Material for matting is sometimes prepared from the culms of thin-walled bamboos by simply cracking the nodes and opening the culms out flat, in much the same way as boards are made.

The ceiling may be covered with a closely placed series of small unsplit culms, or by a latticework composed of lathlike strips split from larger culms. Bamboo matting is favored as a ceiling finish in many areas. In some places the ceiling is omitted altogether, permitting the freer circulation of air welcome in hot, humid seasons. This omission has the added advantage of facilitating the dispersal of smoke from the kitchen fire. In the areas where bamboo is used for housing, a chimney would be a curiosity.

Doors and Windows. For practical reasons, window and outside door openings are generally kept to a minimum. They may be framed with wood or bamboo. The doors themselves may be wood, or they may be woven bamboo matting stretched on a bamboo frame, a panel of bamboo boards set in a hardwood frame, or a sturdy gatelike barrier constructed of bamboo bars. Doors are side-hinged, and fastenings vary from the traditional latchstring to lock-and-chain.

If window openings are provided, they may be framed with bamboo or wood. Most windows are left unglazed and unscreened. Closure may be provided in the form of a bamboo or wooden frame covered with bamboo matting or palm-leaf thatch. Windows are usually hinged at the top; when open -- as they are during most of the daylight hours -- they serve to exclude the sun's direct rays or light rainfall. At dark the house is closed, to keep out the "night air," generally considered unhealthful. Actually, the closing of houses at night is justifiable on other, more realistic, ground: it prevents the entrance of mosquitoes, rats, bats, and other unwelcome visitors. Permanent window bars of bamboo, many of them painted black to simulate iron bars, are frequently used to frustrate would-be trespassers.

Roof. Because of their high strength-weight ratio, bamboos are used to excellent advantage for structural elements in roof construction. In designing the roof, account must be taken of the nature and weight of the roof covering to be used, whether it be grass or palmleaf thatch, halved bamboo culms, bamboo shingles, corrugated sheetmetal, eternite* or tile. The dimensions, orientation, and spacing of the individual structural units that support the roof covering are varied to conform to the requirements of the case.

In the Department of Caldas, Colombia, where bamboo is available in unlimited quantities, a unique type of roof structure has been adopted for the use of bamboo. It makes what appears to be an extravagant use of material, but the resulting structure is strong, durable, and attractive.

Edward Beckwith's photograph of the Toradja house in central Celebes (~~see frontispiece~~) is another striking illustration of the use of bamboo in roof architecture.

Pipes and Troughs. The culms of certain bamboos, with diaphragms removed, serve admirable for the fabrication of pipes and troughs.

Longitudinal halves of bamboo culms make very satisfactory eave troughs. Where rainfall is light and water must be conserved, they are used to collect rainwater from the roof and send it into a barrel or cistern for storage. Where rainfall is heavy, they are used to carry the water from the roof to a distant point, in order to avoid excessive dampness around the house.

Under certain circumstances wash water from the kitchen may be disposed of through bamboo pipes or troughs. For this purpose a sloping trough is more practical than a pipe since it is more easily prepared and, if clogged, may be cleared with greater facility.

Longitudinal halves of bamboo culms with the diaphragms removed make suitable conduits for bringing water for domestic use from its source to the house

*asbestos

by gravity. In Japan, closed-pipe water systems are constructed of bamboo but it is very difficult to make the joints leakproof.

Underground drainage may be effected by means of bamboo pipes of simple construction. The steps in preparing the bamboo for such use are (1) halving the culms, (2) removing the diaphragms from one half to make the lower section of the drain pipe, (3) cutting notches in the edge of the other half to permit the free entrance of water, (4) treating the two halves with preservative (5- to 10-percent pentachlorophenol in light oil), (5) placing them together again in their original relation, and (6) binding them together with wire. Such drains may be extended to any length by placing the smaller tip end of one pipe into the larger basal end of the succeeding one.

To be suited for the uses just described, the bamboo culms should have a diameter large enough to give the required carrying capacity, and the walls should be thick enough to prevent collapse under use.

Bamboo Reinforcement of Concrete. Published references to the use of bamboo in reinforcing cement concrete structures or parts thereof indicate that the practice has been followed to some extent locally, for some decades at least, in the Far East (China, Japan, and the Philippine Islands). During the 1930's several experiments were carried out in Europe, particularly in Germany and Italy, to test the performance of cement concrete beams reinforced with bamboo.

The most recent, comprehensive, and readily available information on the subject is to be found in the report of a series of experiments carried out by and under the direction of Professor H. E. Glenn. Two important sections of this report are quoted here in entirety:*

*H. E. Glenn. Bamboo Reinforcement of Portland Cement Concrete Structures, pp. 123-127. Clemson College Engineering Experiment Station. Bul. 4. Clemson, S. C., May 1950.

Summary of Conclusions
From Results of Tests on
Bamboo Reinforced Concrete Beams

Below is given a summary of the conclusions as indicated from the results of tests on the various beams included in this study.

1. Bamboo reinforcement in concrete beams does not prevent the failure of the concrete by cracking at loads materially in excess of those to be expected from an unreinforced member having the same dimensions.

2. Bamboo reinforcement in concrete beams does increase the load capacity of the member at ultimate failure considerably above that to be expected from an unreinforced member having the same dimensions.

3. The load capacity of bamboo reinforced concrete beams increased with increasing percentages of the bamboo reinforcement up to an optimum value.

4. This optimum value occurs when the cross-sectional area of the longitudinal bamboo reinforcement was from three to four percent of the cross-sectional area of the concrete in the member.

5. The load required to cause the failure of concrete beams reinforced with bamboo was from four to five times greater than that required for concrete members having equal dimensions and with no reinforcement.

6. Concrete beams with longitudinal bamboo reinforcement may be designed to carry safely loads from two to three times greater than that expected from concrete members having the same dimensions and no reinforcement.

7. Concrete beams reinforced with unseasoned bamboo show slightly greater load capacities than do equal sections reinforced with seasoned untreated bamboo. This statement was valid so long as the unseasoned bamboo had not dried out and seasoned while encased in the concrete when the load was applied.

8. When unseasoned untreated bamboo was used as the longitudinal reinforcement in concrete members, the dry bamboo swelled due to the absorption of moisture from the wet concrete, and this swelling action often caused longitudinal cracks in the concrete, thereby lowering the load capacity of the members. These swell cracks were more likely to occur in members where the percentage of bamboo reinforcement was high. This tendency was lessened by the use of high early strength concrete.

9. The load capacities of concrete members reinforced with bamboo vary with the dimensions of the members.

10. The unit stress in the longitudinal bamboo reinforcement in concrete members decreased with increasing percentages of reinforcement.

11. The ultimate tensile strength of the bamboo in bamboo reinforced concrete members was not affected by changes in the cross-sectional area of the members so long as the ratio of breadth to depth was constant but was dependent upon the amount of bamboo used for reinforcement.

12. Members having the optimum percentage of bamboo reinforcement (between three and four percent) are capable of producing tensile stresses in the bamboo of from 8,000 to 10,000 pounds per square inch.

13. In designing concrete members reinforced with bamboo, a safe tensile stress for the bamboo of from 5,000 to 6,000 pounds per square inch may be used.

14. Concrete members reinforced with seasoned bamboo treated with a brush coat of asphalt emulsion developed greater load capacities than did equal sections in which the bamboo reinforcement was seasoned untreated or unseasoned bamboo.

15. When seasoned bamboo treated with a brush coat of asphalt emulsion was used as the longitudinal reinforcement in concrete members, there was some tendency for the concrete to develop swell cracks, especially when the percentage of bamboo reinforcement was high.

16. Care should be exercised when using asphalt emulsion as a waterproofing agent on seasoned bamboo as an excess of the emulsion on the outer perimeter of the culm might act as a lubricant to materially lessen the bond between the concrete and bamboo.

17. Concrete members reinforced with unseasoned sections of bamboo culms, which had been split along their horizontal axes, appeared to develop greater load capacities than did equal sections in which the reinforcement consisted of unseasoned whole culms.

18. Concrete members reinforced with seasoned sections of bamboo culms, which had been split along their horizontal axes and treated with a brush coat of asphalt emulsion, developed considerably higher load capacities than did equal sections in which the reinforcement was split sections of seasoned untreated bamboo.

19. When split sections of seasoned untreated large diameter culms were used as the reinforcement in a concrete beam, longitudinal cracks appeared in the concrete due to the swelling action of the bamboo. This cracking of the concrete was of sufficient intensity as to virtually destroy the load capacities of the members.

20. When unseasoned bamboo was used as the reinforcement in a concrete member, the bamboo seasoned and shrank over a period of time while encased in the concrete. This seasoning action of the bamboo materially lowered the effective bond between the bamboo and concrete with a resultant lessening of the load capacities of the members.

21. Increasing the strength of the concrete increases the load capacities of concrete members reinforced with bamboo.

22. Concrete members reinforced with seasoned bamboo treated with methylolurea did not develop greater load capacities than did equal sections in which the bamboo reinforcement was seasoned culms treated with a brush coat of asphalt

emulsion.

23. The load capacities for concrete members reinforced with unseasoned, seasoned or seasoned and treated bamboo culms, were increased by using split bamboo dowels as the diagonal tension reinforcement along the sections of the beams where the vertical shear was high.

24. The load capacities for concrete members reinforced with unseasoned, seasoned or seasoned and treated split sections of bamboo were increased by the use of a combination of split dowels and the bending up of the upper rows of the split bamboo from the bottom of the beam into the top and covering the sections of the beams where the vertical shear was high.

25. Ultimate failure of bamboo reinforced concrete members usually was caused by diagonal tension failures even though diagonal tension reinforcement was provided.

26. A study of the deflection data for all the beam specimens tested indicated:

(a) That the deflections of the beams when tested followed a fairly accurate straight line variation until the appearance of the first crack in the concrete.

(b) Immediately following this first crack, there was a pronounced flattening of the deflection curve (probably due to local bond slippage) followed by another period of fairly accurate straight line variation, but at a lesser slope, until ultimate failure of the member occurred. This flattening of the deflection curve was more pronounced in the members where the amount of longitudinal bamboo reinforcement was small.

(c) In all cases noted, the deflection curve had a lesser slope after the appearance of the first crack in the concrete, even though high percentages of bamboo reinforcement were used.

27. No pronounced variations were observed when the behavior of bamboo reinforced concrete members under flexure and having "tee" sections was compared with that of equal members having rectangular sections.

28. Bamboo reinforced concrete members under flexure and consisting of "tee" sections were no more effective than were equal rectangular sections, provided the breadth of the stem of the "tee" section was equal to that of the rectangular section and the effective depth of both were the same.

## Design and Construction Principles Recommended for Bamboo Reinforced Concrete

1. In important concrete members, the use of whole culms of green, unseasoned, bamboo is not recommended as the reinforcing material. In concrete slabs and secondary members, green, unseasoned, whole culms may be successfully used when the diameters of the culms do not exceed three-fourths of an inch. When possible, the bamboo used as reinforcement in concrete members, subject to flexure, should be cut and allowed to dry and season from three weeks to one month before using.

2. The use of bamboo culms as reinforcement in concrete members subject to flexure cut in the spring or early summer seasons of the year is not recommended. Only those culms which show a pronounced brown color should be selected for use from a native bamboo grove. This practice will insure that the culms selected are at least three years old.

3. When thoroughly seasoned whole bamboo culms are to be used as the reinvorcement in important concrete members subject to flexure, some type of waterproofing is recommended.

4. When seasoned sections of bamboo split from large diameter culms are to be used as the reinforcement in concrete members under flexure, some type of waterproofing is recommended for the bamboo in all important load carrying members. However, for slabs and secondary members and where the concrete sections are of a size as to allow the placement of the bamboo with a clear distance of from 1½ to 2 inches between the individual bamboo splints and between successive layers,

the use of unseasoned sections of bamboo is recommended provided high early strength cement is used. In no case should the split bamboo sections have a width in excess of three-fourths of an inch.

5. The use of vertical split sections of bamboo culms is recommended to provide for diagonal tension stresses in members under flexure covering the portions of the member where the vertical shear is high and where it is impractical to bend up the main longitudinal bamboo reinforcement for this purpose. In continuous members and where otherwise practical, the practice of bending up the main longitudinal bamboo reinforcement at points of heavy shear to provide for diagonal tension stresses is recommended. Also, in all cases where it is practical, a combination of the above methods is recommended.

6. Proper spacing of bamboo reinforcement is very important. Tests indicate that when the main longitudinal bamboo reinforcement is spaced too closely, the flexural strength of the member is adversely affected. Also, when the main longitudinal bamboo reinforcement is used in vertical rows and when the top row is near the neutral axis of the member, the area of concrete at this section in horizontal shear may be sufficiently lessened as to cause failure of the member due to horizontal shear. In many of the specimens tested under flexural loads, the cause of failure was attributed to horizontal shear; however, in most instances where failure was from this cause, horizontal cracks existed in the concrete due to the swelling action of the bamboo reinforcement.

7. In placing the bamboo reinforcement, care should be taken to alternate the basal and distal ends of the bamboo culms in all rows. This practice will insure a fairly uniform cross-section of the bamboo reinforcement throughout the length of the member and the resultant wedging effect that will be obtained will materially increase the bond between the concrete and bamboo.

8. The design of structural members of bamboo reinforced concrete for flexural loads will be governed by the amount of deflection that can be allowed for the member. In all concrete members subject to flexural loads, a high degree of deflection is obtained in the member before failure occurs. Due to this high deflection, failure of a bamboo reinforced concrete member usually occurs due to other causes considerably before the bamboo reinforcement reaches its ultimate tensile strength. Design values, not in excess of from 3000 to 4000 pounds per square inch for the allowable tensile stress of the bamboo reinforcement, must usually be used if the deflection of the member is to be kept under 1/360 of the span length. When this low design value is used for a bamboo reinforced concrete member under flexural loads, a high factor of safety against ultimate failure of the member usually results.

9. The same procedure as that used for the design of structural concrete members reinforced with conventional steel is recommended for the design of concrete members reinforced with bamboo. Values have been recommended for the allowable unit bond stress between concrete and bamboo, for the allowable unit tensile stress in the longitudinal bamboo reinforcement and for the modulus of elasticity for bamboo. These recommended values should be used in designing a concrete member reinforced with bamboo for flexural loading. It is also recommended that "tee" beams be designed as rectangular beams ignoring the flange width in the calculations.

10. Some of the important characteristics of concrete members reinforced with bamboo on which future research should be done include:

(a) Use of those species of bamboo in which the modulus of elasticity is higher than that of the species used in these experiments.

(b) More exact data on diagonal tension reinforcement.

(c) Further tests of the use of green uncured bamboo culms as the reinforcement where the conditions are such that the bamboo will be completely seasoned while encased in concrete.

(d) More exact data on the bond between concrete and bamboo.

(e) The use of other waterproofing agents than those used in these tests to insure against the swelling action of seasoned bamboo when placed in wet concrete.

It is obvious, from this very comprehensive and carefully considered series of statements, that the reinforcement of cement concrete with bamboo cannot be

undertaken with confidence until a great many factors have been considered. Careful and expert attention to many details in execution is essential to success. Severe limitations must be taken into consideration. Apparently, the bamboo reinforcement of non-load-bearing members, such as wall panels and floors resting on well-compacted earth, has more to recommend it, from the practical point of view, than the bamboo reinforcement of load-bearing members of a structure.

Geographical Distribution of Bamboos. Bamboos occur as more or less prominent elements in the natural vegetation of many parts of the tropical, subtropical, and mild temperate regions of the world, from sea level to altitudes of more than 13,000 feet, wherever a suitable combination of ecological factors prevails. Their natural distribution is very uneven, both as to abundance and variety of kinds in a given area. Through the agency of man, the distribution of many species of bamboo has been greatly widened. This process probably has been going on for a long time, and the actual extent of it has not been surveyed. However, some of the most valuable species have not been distributed to any important extent and much remains to be done to make these more generally known and available.

The greatest concentration of bamboos and the highest development of their use are to be found on the southeastern borders of Asia and on adjacent islands. This area extends from India to China on the mainland, and from Japan to Java among the islands. Some 20-odd species of bamboo have been reported from the little-known flora of Africa, and many of these are used by the native peoples for house construction. The Island of Madagascar, whose flora is more fully known, has been found to have more native species of bamboo than are known to occur in the whole of Africa. Australia has perhaps a half-dozen native species; Europe none. In the Western Hemisphere, the natural distribution of bamboos extends from southern United States to Argentina and Chile. Some 200 species are native to this area, but they are very unevenly distributed. Many of the recorded species are very imperfectly known, and some kinds have been recorded under more than one name, but the known bamboo flora of the world probably totals more than 700 species, classified in about 50 distinct genera.

+

Figure 1.-- Bamboo scaffolding is used in constructing an apartment house in Cali, Colombia. In strength and durability bamboo is well-suited for the purpose; for economy it is probably unequaled.

Figure 2.--From supporting posts to rafters and sheathing, this cottage in the Ecuadoran lowlands is made entirely of native bamboo, Guadua angustifolia. The posts may serve for five years; the siding may remain in serviceable condition for decades.

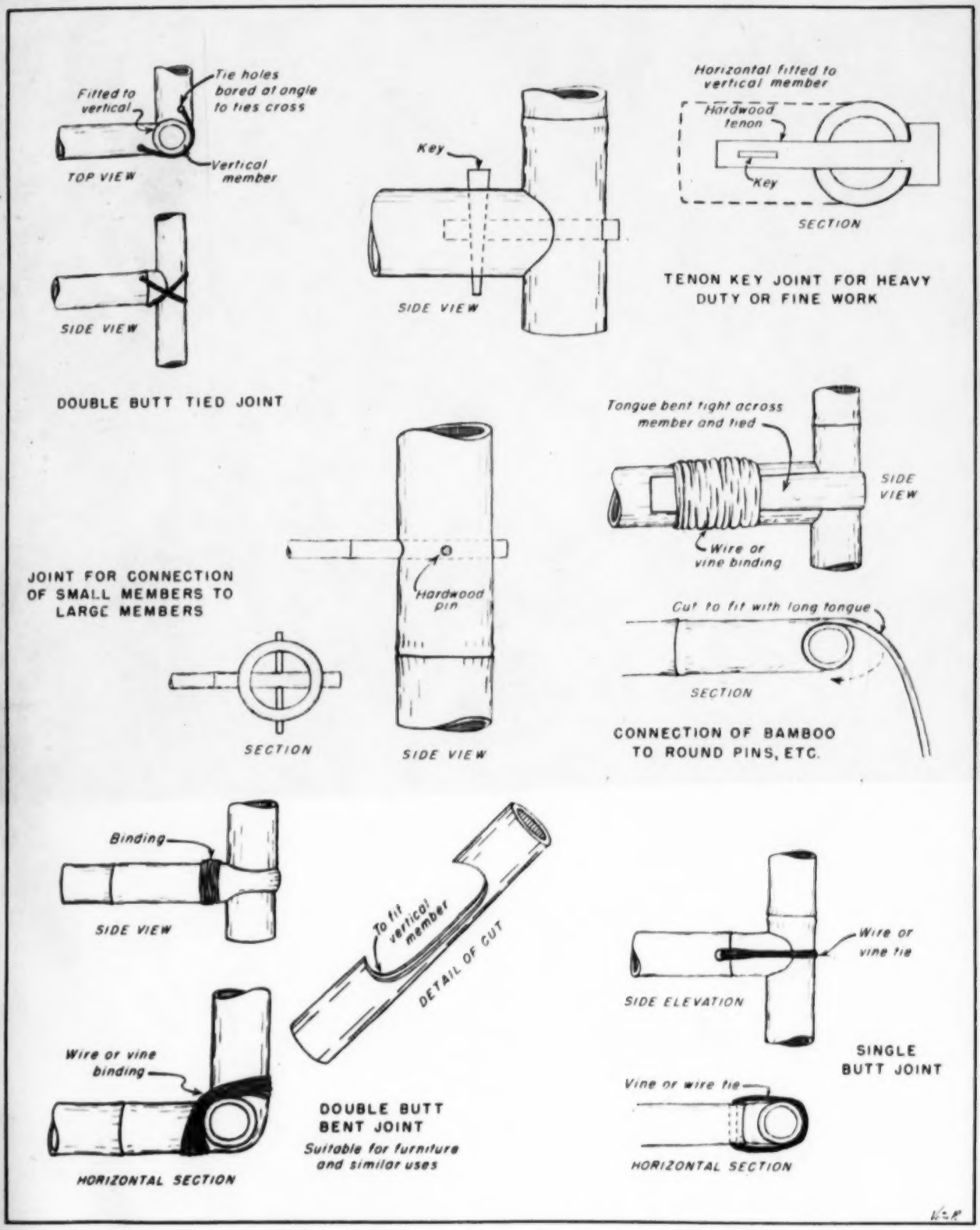



Figure 7.--Joints used in building with bamboo.

Figure 12.--Wide bamboo strips support and protect an adobe wall in El Salvador, forming a type of construction called bajareque in many Latin American countries. In El Salvador the common bamboo, Bambusa vulgaris, is available everywhere except in the driest areas, and its culms are standard material for many purposes.

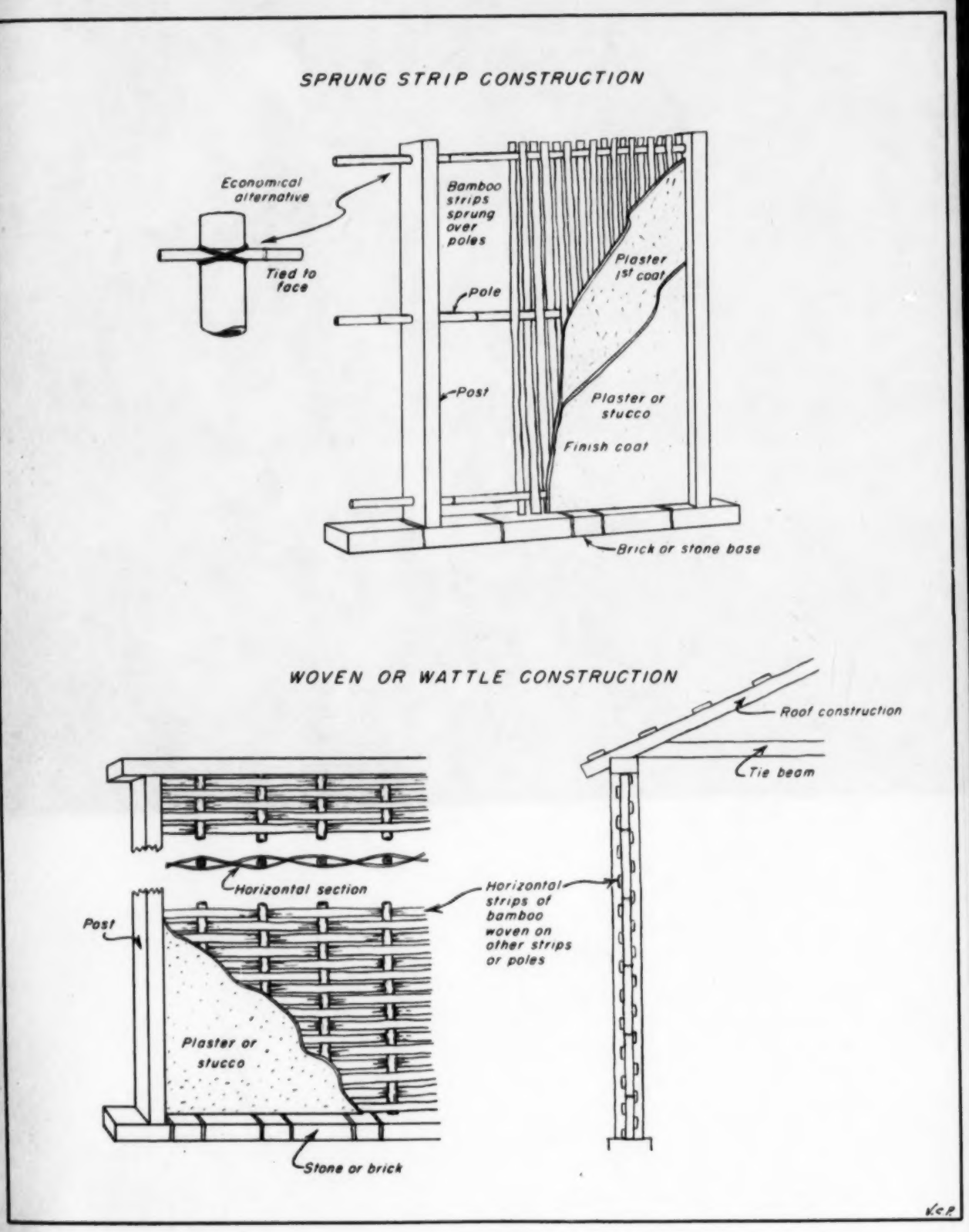



**Figure 13.-- Types of wall construction used with bamboo.**

Merrington, G. J. Some aspects of climate as it affects building and planning. (Journal of the Town Planning Institute, Nov. 1956, vol. 42:10, pp. 248-251.) Extracts from paper read to Central Africa Branch.

About one third of the sun's energy reaches the earth's surface where it is transformed into other types of energy. Evaporation, convection, heat conduction, reflection and radiation occur. The amount of radiation received depends on six main factors:

1. Position of sun at time of day.
2. Position of sun according to season.
3. Influence of clouds and other obstructions.
4. Direction of slope and angle of slope of roofs, walls, etc. It is possible to select sites to suit requirements in so far as insolation is concerned, and select suitable slopes for roofs, walls and other surfaces.
5. Amount of radiation depends upon altitude above sea level (higher altitudes receive more solar radiation normally).
6. Reflective qualities of surroundings influence amount of insolation.

Presence of sunlight in building is often desirable and often essential; it is a powerful bactericidal agent, it is essential for the growth of children, and it creates an effect of psychological wellbeing. Sun should be admitted to hospital wards, children's playrooms, solariums, etc.

Industrial buildings may often demand total exclusion of sun's rays.

The main problem in a tropical country is to control penetration of direct sunlight. If this cannot be done by orientation, devices must be used such as shading, reflection, insulation, and the shaping of materials. The most effective means of control is by shading or blocking the direct rays of the sun before they can pass through glazed surfaces. The main elements of the building must be taken into consideration in orientation: openings in external walls, arrangement of projections such as canopies, screen walls, balconies, etc., and the use of louvres, vertical fins, awnings, trees, creeper-covered pergolas, etc.

Louvres, horizontal or vertical, have been used with success in large blocks of flats in South America, Israel and southern Italy. They may be fixed or mobile and of various types of construction, such as fixed concrete slabs, asbestos blinds, or movable aluminum sheets.

Natural shading in the form of plants or trees can be used on the surface of a building or some distance away from it. Where plants are deciduous there is the advantage of having shade when needed, and also of having it removed at the right seasons. Bougainvillaea is particularly good for shade because it grows rapidly. Trees should be grown with regard for the angle of the sun and with care for circulation of air immediately around the building.

In reflection the following figures have been published:

| | |
|---|---|
| Gravel, granite, red and brown soils | 22-25 per cent |
| Sand veld | 17 |
| Sand | 8- 9 |
| Garden soil | 6 |
| Long grass | 2 |

Soil is actually a cooling element, a fact not commonly realized. Bare soil is cooler by day and warmer by night than when covered with grass. Paved and asphalted areas near houses cause heat to radiate directly into the house.

Towns are warmer than surrounding land both during day and night; in fact, they may have a wind system of their own, the warm currents of air tending to rise. Open spaces throughout a town reduce thermal heating and prevent huge rising currents of air. Where winds are not considered undesirable on buildings, major arteries can be orientated perpendicular to prevailing winds, with minor roads parallel where trees and houses will reduce the flow of wind.

The article concludes with the information that consulting meteorologists were called in to advise on the planning of Chandigarh so that the whole concept of layout was based on climatological factors.

T.

Solar heating: nine-room house going up in Denver to test system.
(Engineering news-record, Aug. 16, 1956, vol. 157:7, p. 81.)

Dry

The complete account is printed below:

(moderate temperature)

A solar-heated house is being constructed in Denver for George O. G. Lof, consulting engineer. Lof believes the sun shining on heat collector panels on the flat roof will supply 60% to 75% of the total heating energy.

The nine-room house will test a heating system developed by Lof and American Window Glass Co., Pittsburgh. The firm is supplying the roof-top heating panels at a cost of more than $2,000.

Two heat-collector units will be arranged in heavy aluminum frames which are tilted to the south at a 50-deg angle. Each unit will contain sixteen 6x3-ft sections. In each section will be overlapping plates of glass, arranged like shingles. One-third of the area of each plate will be blackened to absorb sunlight and convert it into heat. The other two-thirds of the surface will be clear, treated glass from which only 10% of the sunlight will be lost by reflection.

A blower in the basement will circulate air at the rate of 1,000 cfm between the glass plates in the collector. The air, heated to 200 F, then will be blown through two hollow columns, 18 ft high and 3 ft in diameter, filled with loose ? in. dia. rocks where the heat will be stored.

When no room heating is needed in the summer, the system will do most of the domestic water heating. A natural gas heating plant of conventional design will be built into the solar-heating system for supplementary use in coldest weather.

## CURRENT PROJECTS IN NORTH AMERICA

Who does what in urban renewal. (Architectural forum, Nov. 1956, vol. 105:5, pp. 129-130, with illus.)

In Cleveland, Ohio, the Garden Valley planned community was initiated by a group of local businessmen who established a $2 million fund for purchase and development of 247 acres of industrial wasteland. The Foundation will get its money back when the land, which it has now sold to the city, is purchased by private developers and the Metropolitan Housing Authority of Cleveland. A site plan for the entire project was drawn by the City Planning Department of Cleveland.

CDC urges completion of master plan -- endorses bonds. (Bulletin, Citizens Development Committee, Cincinnati, Ohio, Nov. 1956, vol. 13:2, pp. 1-4, with maps.)

Area no. 1, the already financed 58-acre Laurel-Richmond development has advanced to 80% of property acquisition, 50% of family relocation and 40% of building demolition.

Area no. 2, adjacent to the central business district, is the West End 435-acre problem tract, a serious threat to the continued prosperity of Cincinnati for which a solution has been devised. With Cincinnati voter approval . . . $8 million will be used to match the $16 million federal allocation to acquire, clear and prepare the site for private development according to the Master Plan. Of the $8 million, $6 million will construct major streets to serve not only the area, but particularly to provide access between the Western Hills and downtown. Federal funds are formally earmarked and private developers, both local and out-of-town, have submitted agreements to provide much needed, tax producing new industrial and apartment developments.

Perth Amboy redevelopment program shows more progress. (Journal of housing, Oct. 1956, vol. 13:9, p. 353, with illus.)

Single family homes. More than 50 of the 195 houses planned now have been completed. The city already has completed all noncash local grants-in-aid, including such site improvements as water mains, street paving, sewerage, for a total of $311,576. The homes are ranch houses and Cape Cod cottages selling for about $13,000 to $17,000.

Programs in 3 areas provide big family or single-person housing. (Journal of housing, Oct. 1956, vol. 13:9, p. 352; with illus.)

Akron, Ohio, Housing Authority opened for occupancy a new project, the Elizabeth Park Homes Extension which is unique in two ways: 1, it is the first low-rent project in Ohio to be financed locally without federal subsidy; 2, every unit in the 24-family project has 4 bedrooms to accommodate big families. (A modern 8-unit project for senior citizens will be constructed under the same local financing formula within the next five years.) Rental rate has been fixed at $55 a month. In addition to rent, tenants will pay utility companies for gas and electric power and must furnish their own electric refrigerators and gas cooking stoves.

New satellite city rising at site of Greenbelt town. (House and home, Nov. 1956, vol. 10:5, pp. 93, 101, with illus.)

At Forest Park, 13 miles north of Cincinnati, two developers, M. L. Warner and Joseph Kanter, have bought a former Greenbelt property, called Greenhills. The site has already the first 400 of a planned 10,000 homes on 3,700 acres. There will also be a regional shopping center, office buildings and a 239-acre industrial park.

Houses from $14,000 to $60,000 are planned. Different priced areas are to be separated by dividers like ridges, streams and plantings. Park areas within

the housing area will be reserved to keep the natural beauty of woods and streams. Other tracts will be set aside for a civic center and recreational space. Forest Park adjoins a 2,000 acre public park.

Lot sizes will vary from about 7,000 sq. ft. to 12,000 sq. ft. with 65' minimum frontages. In addition to Warner-Kenter's construction, other improved lots will be sold to builders and to individuals who want to build houses. All architectural design and landscaping is subject to review by the developers who retained the original land planner, Justin R. Hartzog, to draft the master plan for Forest Park.

When the federal government decided to break up the Greenbelt properties in 1952, local capital organized the Cincinnati Community Development Company to attempt a similar project, but failed to get going. In 1953 Warner-Kanter bought the property subject to approval of a master plan. Cincinnati engineers and architects produced the plan in cooperation with Hartzog.

Preplanned subdivision from aerial photographs. (American city, Oct. 1956, vol. 71:10, pp. 177, 181, with maps.)

In Canada, the city of Hamilton and the country of Wentworth preplan future residential subdivisions in undeveloped areas by using contour maps prepared from aerial photographs. Subdividers are then required to make their plans conform to official designs, creating balanced neighborhoods with schools, playgrounds, shopping centers, and other urban facilities in the most efficient locations.

The technique is being applied by the Hamilton-Wentworth Planning Area Board for a 381-square mile metropolitan district, including the city of Hamilton and outlying, sparsely settled areas, in order to relate in a final unified pattern, widely separated subdivisions. Originally most of the townships were divided into 200-acre grid blocks surrounded by roads on all sides. The blocks can be treated as separate residential neighborhoods, or they can be widened, and roads made into major arteries if feasible.

The completed maps, combining basic air photographs and topographic and planimetric maps, show building locations, wooded areas, streams, ditches, railways, power lines, etc.

Toronto, Canada. Planning Board. Wood-Wellesley redevelopment area; third report. Toronto, 1956. Various pg., illus., plans, tables.

The area defined for redevelopment is not considered to have physically deteriorated to the stage when it is an esthetic or economic burden to the city, but it is considered to be an economically underdeveloped area well located for residential accommodation for those working in the center of the city. Proposals by private investors have been studied by the Planning Board with preference given to that submitted by Principal Investments. All schemes have been summarized and certain conclusions drawn by the Board. Conformity to City Planning Board specifications was required in regard to density, parking facilities, residential units, etc. Elevations had to offer attractive additions to downtown Toronto. Traffic access was limited to as few points as possible. Compliance with city by-laws was important in order to eliminate changes in design. Spacious accommodations and generous recreational facilities were offered by Principal Investments which were satisfactory to the Board. The proposed rental structure was submitted by the developer subject to Central Mortgage and Housing Corporation as a limited dividend project. Priority was given to present tenants of the area for relocation within the project.